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ABSTRACT

This environmental education curriculum guide is designed for teacher use in the fourth grade. A collection of multidisciplinary activities, guidelines for conducting field trips, and a resource section are included. The activities are organized within three categories--awareness, man's use, and problem solving. They are designed to provide the student with opportunities to make observations, collect and record data, interpret the data, and summarize. The use of these activities, either individually or in sequence, aims to establish a climate of pupil participation, discussion, and interaction. Each activity is classified by topic, subject, completion time, and grade level. All activities include: objectives, a materials list, teacher background information, a preactivity, the activity, a postactivity, and additional activities. Guidelines for conducting a field trip are included to facilitate the teacher in teaching her students in the out-of-doors. The guidelines cover pre-field trip, field trip, and post-field trip planning. The resource section lists speakers, films, free and inexpensive materials, pamphlets, and conservation and environmental groups which may be contacted for information about environmental topics. (TK)

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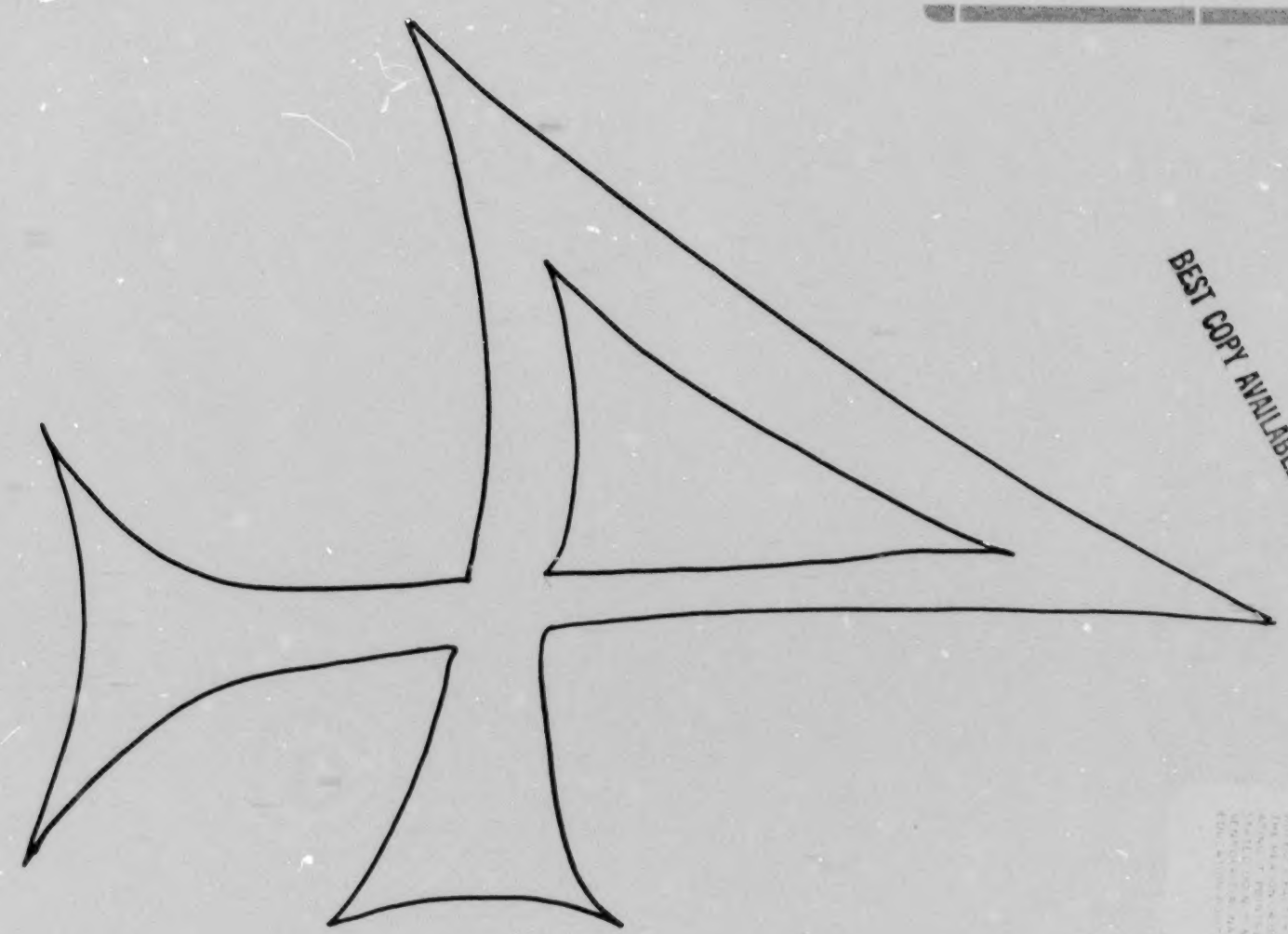

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ED 099219

A MULTIDISCIPLINARY PROCESS

CURRICULUM IN ENVIRONMENTAL EDUCATION

K - 12

Under Provision of Public Law 91-516, Grant No. OEG-0-72-5436

Project No. RO 21178

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1973

PROJECT SUMMARY

This project was designed to provide a working model for the structure and implementation of a multidisciplinary process curriculum in environmental education, grades K-12. This model emphasizes the broadly based socio-ecological approach endorsed by the Edmonds School District Environmental Education Council, as a unifying theme to be incorporated into a comprehensive environmental program. Such an approach seeks to integrate the cultural, historical, and social aspects of man with fundamental sociological principles applicable to all living organisms. It will utilize the school and total community as a field laboratory and as a basis for the investigation of ecological relationships and environmental problems. The design of the model presented here includes five phases which have been sequentially organized into the following areas:

1. To plan for the structure of appropriate training and student activities as designed by two writing teams selected on the basis of defined qualifications. The participating teams represented each grade level, K-6, and each relevant secondary discipline, 7-12. The team consulted with community, local, state, and natural resource personnel and incorporated existing materials into a total program that reflects the objectives established.

2. A plan for implementing the materials written by means of training sessions at the elementary building level and for the specific secondary disciplines and secondary teachers involved. The writing team will form a nucleus for the training of teachers in use of materials and equipment.

3. A plan to evaluate the effectiveness of materials and methods used through formal and informal feedback from students and teachers involved. Students will be evaluated on the cognitive aspects of the curriculum materials written and both teachers and students on the attitudinal aspects.

4. A plan for revision and retraining as necessitated by the analysis of evaluation procedures and results, and from community feedback.

5. A plan to continue the program utilizing district and community funds under the guidance of the Edmonds District No. 15 Environmental Council in cooperation with the District Environmental Consultant.

This project is a "beginning". It was written during four weeks of the summer of 1973. The writing team realizes that they have just scratched the surface of putting together a K-12 multidisciplinary environmental education curriculum. We know that it needs to be tried by teachers, and hope that you will use it while instructing your students. Try it out! Write in it and jot down your notes. Revise, add and delete! Then give us feedback as to how you used it and how you felt about the whole thing so that we can work your ideas into our revision next summer. There are extra lesson outlines in the back to experiment with. Now -- enjoy!

Grades 3, 4, 5 and 6

INTRODUCTION

This is a series of lessons which are still in rough draft form. We would encourage you to use, refine, revise, delete and add to these lessons. They are only as good as your ideas make them. To be of greatest value, the lessons should undergo continuous revisions for improvement. Please use the open spaces on the lesson plans, and the forms at the end of this section, to make your own notes and lessons. Many minds are better than few!

We have attempted to provide opportunities for the student to make observations, collect and record data, make some interpretations of the data, and summarize. The activities were designed to emphasize this process, thus developing the ability of each student to think for himself. The use of a certain question sequence facilitates this thinking process. It can establish a learning climate which will foster pupil participation, discussion and interaction. It can allow students to interpret their own observations and record data. In recognition of the high quality Environmental Education materials previously published by Edmonds School District #15 and surrounding school districts, it was decided to concentrate our efforts on activities and processes which seemed to be new material.

Many lessons include task cards for student use. The advantages of a task card over a work sheet are: 1) They are more manageable for use in the field; 2) Students are more free to collect their own data, since directions are kept simple and open-ended, and are printed on the card; 3) The task seems attainable at the outset, and students are able to experience a sense of completion and success at the end; 4) By having only one task card per group, fewer records need be kept by the children and the adult in charge.

Litter Lessons are identified by the torn paper design in the upper right-hand corner of the page. They will appear this way throughout the various grade levels of three through six.

The entire litter section of the curriculum project was funded by the State of Washington Department of Ecology, and drawn up by the Federal Project Environmental Education Writing Team during the summer of 1973. The litter sections are a part of the overall Environmental Education Federal Project. It is hoped that it will provide additional environmental awareness among children at the elementary level.

ACKNOWLEDGMENTS

TOPIC: Animals
SUBJECTS: Math, Lang. Arts, Soc. Studies
EST. TIME: All Year
GRADE: 4

AW

Activity

ACTIVITY (on going)

Periodic Records and Measurements

At the beginning of the school year and at the end of each quarter, collect the following data:

1. Height
2. Weight
3. Favorite food, color, friend, hobby, T.V. show, etc.
4. Handwriting sample
5. See chart page 3. Make a ditto and enough copies for each child. Cut copies into four columns. Use one column at a time during month listed. (Students could be influenced by seeing previous data columns.) Save all columns until June.

WHAT A CHANGE!

PRE-ACTIVITY (2-4 days) Autobiography

Write an autobiography. Tell especially about your various stages from infancy until now (height, weight, family size, likes and dislikes, friends, etc.) Child may want to submit pictures and parental quotations or parent's written comments.

POST-ACTIVITY (30 minutes)

Interpretation of Data

1. At end of quarter, pass out all data.
2. Have students glue their four columns side by side on one sheet of paper.
3. Have the following discussion.
4. Predict how tall, or how much you will weigh when you're 18 years old.

DISCUSSION (to hold near the end of the year)

1. What do you notice about your records?
2. What are some other changes you've noticed?
3. How do you account for the differences in yourself between the beginning of the year and now?
4. How could you summarize our discussion of your changes during this year?

SUGGESTED ADDITIONAL ACTIVITIES

Math: Make a graph of height and/or weight of themselves or of whole class.

LEVEL V OBJECTIVE

Students will understand how the structural and behavioral changes of plants and animals takes place.

LEVEL VI OBJECTIVE

The student will know that he experiences physical and behavioral changes over a period of time.

Materials

MATERIALS

Tape measure
Scale
Questionaires
Student folders

PERSONAL DATA CHART

MY DATA FOR SEPTEMBER	MY DATA FOR NOVEMBER	MY DATA FOR MARCH	MY DATA FOR JUNE
HEIGHT	HEIGHT	HEIGHT	HEIGHT
WEIGHT	WEIGHT	WEIGHT	WEIGHT
FAVORITE FOOD	FAVORITE FOOD	FAVORITE FOOD	FAVORITE FOOD
FAV. COLOR	FAV. COLOR	FAV. COLOR	FAV. COLOR
FAV. FRIEND	FAV. FRIEND	FAV. FRIEND	FAV. FRIEND
FAV. HOBBY,	FAV. HOBBY	FAV. HOBBY	FAV. HOBBY
FAV. T.V. SHOW	FAV. T.V. SHOW	FAV. T.V. SHOW	FAV. T.V. SHOW

HANDWRITING SAMPLE:
(September)

HANDWRITING SAMPLE:
(November)

HANDWRITING SAMPLE:
(March)

HANDWRITING SAMPLE:
(June)

TOPIC: Animals
SUBJECT: Soc. Studies
EST. TIME: 45-60 minutes
GRADE: 4

AW

THUMBS UP

PRE-ACTIVITY (15 minutes) Creative Time

Using the record "Typewriter Song", student will act out typing using elbows, nose, knees, and toes (no hands). Discuss what adjustments would need to be made without hands.

What other qualities and attributes set man apart from other living creatures?

1. Two forward-looking eyes and overlapping vision.
2. Ability to see in three dimensions and estimate distances.
3. Strong hands with opposable thumbs.
4. Upright position.
5. Large brain

Activity

ACTIVITY (20 minutes each day for 1 wk.)

Experience Handicap
Select one or do at intervals:

1. Do not talk for 1/2 hour, but still do work and communicate in other ways.
2. Use only opposite hand from that which is your preference.
3. Be blindfolded - have a seeing partner and trade roles.
4. Work without hands.

POST-ACTIVITY (15-20 minutes)

Analyze and Apply

1. In what ways would your life be different if....
2. What implements which we have would have to be redesigned?
3. Can you think of articles of clothing we might want to change? (gloves, zippers, buttons, etc.)
4. How does sight, 2 arms, etc., help us adapt?
5. How would we be different without one or another item?
6. What actions would man have to take to adapt to life in many different environments? Example: The South Pole and extreme cold. Can you think of a place where man cannot live without creating an artificial environment for himself? (space, under-water)

SUGGESTED ADDITIONAL ACTIVITY

Try to adapt by not using time or any time piece for half a day.

LEVEL V OBJECTIVE

Students will understand adaptations of animals.

LEVEL VI OBJECTIVE

The student will know that he is dependent on using an established means of communicating, such as talking, using his hands and using his eyes.

Materials

MATERIALS

Blindfolds
Record of "Typewriter Song"

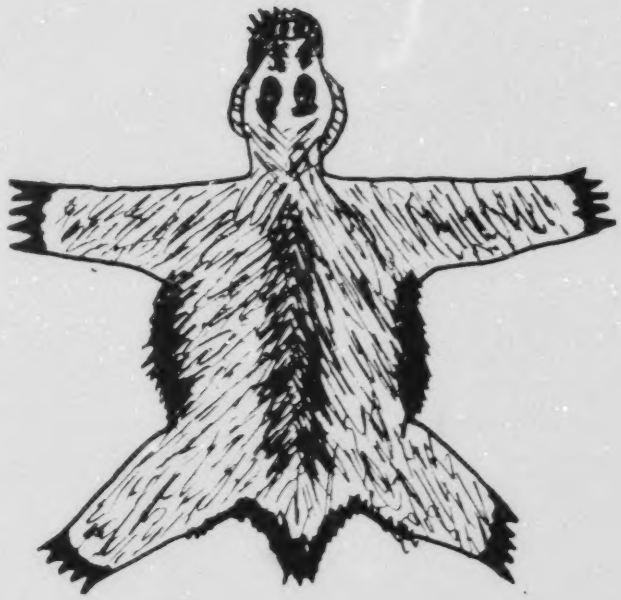
TEACHER BACKGROUND INFORMATION

Be sure the blindfolds are not too tight.

TOPIC: Animals
SUBJECTS: Science
EST. TIME: 60 minutes
GRADE: 4

AW

FELT PELT



Activity

ACTIVITY (30 - 40 minutes)

Pelt Investigation

1. Obtain study mounts of skulls and pelts of animals of the area. Observe 2 pelts compare teeth, feet, head shape, body structure, fur, feathers, hair or scales. With a partner, record observations on Task Card A.

2. Do Task Card #2.

PRE-ACTIVITY (15 min.)

Picture Investigation

1. Put an example of Task Card #1 on board or overhead projector. Show pictures of animals that differ markedly in type of mouth, teeth, type of feet, etc. Record observations on enlarged Task Card. (Use dog and bird, cat and fish.)

2. Project enlarged sample of Task Card B. Predict the type of foods and home each animal would have. (Cat and dog, bird and fish, other.)

POST ACTIVITY (15 min.)

1. What did you notice about these pelts and skulls?

2. What differences did you notice in the animals' teeth, etc.?

3. How would these differences effect their food? How...habitat or homes?

4. From what you've observed, what can we say about the feet (claws, teeth, head shape, body structure, fur, feathers, hair or scales.)

SUGGESTED ADDITIONAL ACITVITIES

Choose a rare animal and find out how its head shape, teeth, and paws adapt it to survive.

LEVEL V OBJECTIVE

Students will understand how the structural and behavioral changes of plants and animals take place.

LEVEL VI OBJECTIVE

The student will know the differences in physical characteristics of skulls and pelts of animals in his local environment.

MATERIALS

Pictures of animals,
Mounts of skulls and pelts
See your local coordinator of community volunteers in Edmonds, contact Jude Petrie, for getting a resource person with pelts and skulls.

TEACHER BACKGROUND INFORMATION

Remind students to handle pelts with care.

TASK CARD #1

Describe what you observe about each part of each animal. Here are some words you might want to use: sharp, pointed, broad, slender, long, short, hairy, flat, white, yellow, grinding, round, web, etc.
Work with partner.

	CLAWS	TEETH	HEAD SHAPE	BODY STRUCTURE	FEET	FUR, FEATHERS, HEAD SCALES
PELT #1						
PELT #2						

TASK CARD #2

From what you have observed from the skull, predict the food the animal would eat and from the pelt, predict what type of home they would have. Work with a partner.

	FOOD		HOME
SKULL #1		PELT #1	
SKULL #2		PELT #2	

TOPIC: Observations
SUBJECTS: Science, Lang. Arts
Art
EST. TIME: 45 minutes
GRADE: 4

AW

PRE - ACTIVITY (10 minutes)

Compare and contrast a chair and a person.

LEAFY LEAF

Activity

ACTIVITY (15 minutes)

Leaf Study Task #1
(See page 3)

POST-ACTIVITY (10 minutes)

1. Go back to classroom, or have a large field chart outdoors. Accept all student responses, list their leaf similarities and differences on the board.

2. Grouping - Ask: "Which of these similarities and differences could be put together because they are alike in some way? Why are they alike?" List groups on board.

3. Labeling - Ask: "What would be a good title or label for this group (to show why they are all alike)? Label all groups.

4. What can you now say about leaves?

POSSIBLE LIST	POSSIBLE GROUPS AND LABELS	
green stem	Stems	Texture
round stem	green	hairy
round edges	round	slick
big veins	sticky	soft
hairy texture	flat-sided	prickly
light green		
oval shape	Edges	Shape
brown stem	round	oval
wavy edge	five points	round
slick	wavy	heart
soft	pointed	triangular
prickly		
sticky	Veins	Color
pointed	big	light green
opposing	opposing	dark green
triangular	small	green-yellow
heart-shaped	palmlike	

SUGGESTED ADDITIONAL ACTIVITIES

1. Compare and contrast 2 trees, 2 animals, 2 houses, etc.
2. Art - leaf prints (see Edmonds District Curriculum Art Guide)

LEVEL V OBJECTIVE

Student will appreciate the enormous diversity of plants.

LEVEL VI OBJECTIVE

The student will recognize the similarities and differences in leaf structure such as shape, texture, and color.

MATERIALS

Task Card for each student
2 leaves per student (gathered by student)
Staples or glue

TEACHER BACKGROUND INFORMATION

Try to get leaves from ground. Respect the environment. Take only enough leaves for the study.

TASK #1

1. Go out and find two different types of leaves. Glue them on this card.

Put Leaf No. 1 Here

Put Leaf No. 2 Here

2. Make a list of all the similarities you can find.

Leaf No. 1	Leaf No. 2

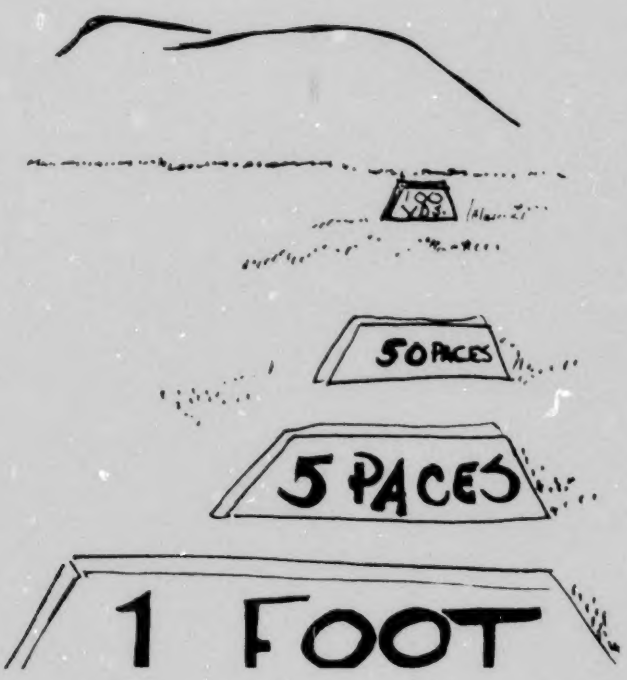
3. Make a list of all the differences you can find.

Leaf No. 1	Leaf No. 2

TOPIC: Observation Skills
SUBJECTS: Lang. Arts, Art
EST. TIME: 60 minutes
GRADE: 4

AW

100 TO 1



PRE-ACTIVITY (30 min.)

Pacing and Describing
(Do one or all of these!)

1. Take students outside. Tell them that pacing is their natural, deliberate, rhythmical stride. Have them practice pacing from one given point to another, trying to use same number of paces each time. Practice pacing the distances given on the Task Card (see page 3).

2. Have one interesting object for the class to observe. Discuss using the five senses. List discriptive words under each sense on board. Have students observe and sketch. Describe the object as a class.

3. Have a grab bag full of interesting objects. Let each student draw one out to observe, sketch and describe on his own.

ACTIVITY (20 minutes)

Observe one plant in detail.

See Task #1 (page 3)

POST ACTIVITY (10 minutes)

1. Students could use the microscope activity on Task #1 as a Post Activity.
2. Trade papers and analyze completeness and problems.
3. Repeat activity.

SUGGESTED ADDITIONAL ACTIVITIES

This activity can be done with an mals or with things such as soil or water.

LEVEL V OBJECTIVE

The student will be able to identify plants of his local environment.

LEVEL VI OBJECTIVE

The student will be able to describe objects in his local environment by sketching and by written description.

MATERIALS

Paper and pencil
One hand lens per student
An interesting object for each student to observe
One task card per student

TEACHER BACKGROUND INFORMATION

See guideline: Teaching Children Outdoors

LEARNING HOW TO OBSERVE - TASK #1

Find an interesting plant in the study area. It may be a tree, bush, grass, vine, or any other.

1. Observe, sketch and describe it in as much detail as possible from:

   A. 100 paces

   B. 50 paces

   C. 5 paces

   D. One foot

2. Examine one part with a hand lens. Describe which part of the plant you chose. Observe, sketch, and describe it in as much detail as possible.

3. Using a microscope, re-examine that part of the plant which you chose to examine in Step #2. Observe, sketch, and describe it in as much detail as possible.

QUIETLY WITH FEELING

TOPIC: Observation Skills
SUBJECTS: Soc. Studies, Science, Lang. Arts
EST. TIME: 70 min.
GRADE: 4

AW

Activity

PRE-ACTIVITY (lo minutes)

LIST QUIET AREAS

1. Students list quiet areas in the classroom (one minute)
2. Students list quiet areas in the school (one minute).
3. Students list quiet areas on the school grounds (one minute).
4. Teacher list all areas suggested from students. List on the chalkboard.
5. Students choose the 3 most quiet areas in each of the three spots above.

ACTIVITY - Tape "quiet" areas - 30 min.

1. A team of two students tape record nine chosen areas.
2. Tape two minutes in each of the areas above.

POST-ACTIVITY (30 minutes)

Listen to the "Quiet"

1. Play back recordings.
2. Analyze sounds heard and list them.
3. Discuss the meaning of continous noise in our lives.
4. Discuss the meaning of quiet in our lives today.
5. The Weyerhauser Co. Hdqtrs plays a recording of continous noise to stimulate their workers. (Discuss some reasons why.)
6. The decibel level of noise created by many modern dance bands can cause a permanent hearing loss. How does that fact affect you?

SUGGESTED ADDITIONAL ACTIVITIES

Visit the Weyerhauser Co. Headquarters located in Federal Way.

LEVEL V OBJECTIVE

Students shall recognize various pollution problems, their causes and effects.

LEVEL VI OBJECTIVE

The student will recognize the sounds in quiet areas around him and how they personally affect him.

Materials

MATERIALS

Tape recorder (battery operated)
Tapes

TEACHER BACKGROUND INFORMATION

A little imagination and a lot of interpretation is appropriate here. More time could be well spent on the ramifications of this lesson.

TOPIC: Observation Skills
SUBJECTS: Lang. Arts, Creative Dr.
EST. TIME: 40 min.
GRADE: 4

AW

TALE OF THE CHAIR

PRE-ACTIVITY (10 minutes)

Show the film - "A Chairy Tail"

Activity

ACTIVITY (10 minutes)

Discussion

Divide into groups. List how the chair (non-living) is similar to living things.

POST-ACTIVITY (20 minutes)

Creative Writing

Pick an object that is non-living and write how it is similar to man. For an example: How is a bottle related to a man?

SUGGESTED ADDITIONAL ACTIVITIES

Write a story - "I've Been Turned Into A Bottle"

LEVEL V OBJECTIVE

Students will comprehend relationships among organisms and their non-living environment.

LEVEL VI OBJECTIVE

The student will be able to recognize the similarities between a chair and a person as seen on the film "A Chairy Tale".

Materials

MATERIALS

Film: "A Chairy Tale" - EF 120

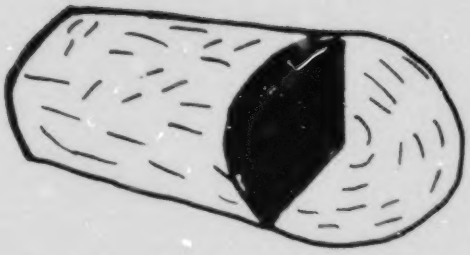
TEACHER BACKGROUND INFORMATION

"A Chairy Tale" is a fairy tale of a youth who tries to sit on a chair, but the chair declines to be sat upon. The ensuing struggle, first for mastery and them for understanding, form the story.

SHAPELY MOTHER NATURE

TOPIC: Observation Skills
SUBJECT AREAS: Math, Art
EST. TIME: 60 min.
GRADE: 4

AW



PRE-ACTIVITY (20 min.)

Art Lesson On Shapes

Discuss shapes (circle, square, triangle, rectangle, angles, etc.) Pass out paper and chalk for each student. Students close eyes and draw a shape which the teacher dictates. (Example: draw a big circle, a small triangle, etc.) Color the design with chalk.

Activity

ACTIVITY (20 min.)

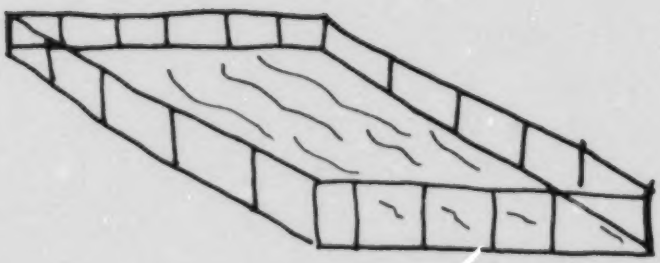
Observe and Draw

Take a walk outside. Sit down and observe the geometric shapes in an area. Draw pictures using these shapes as a basis.

POST-ACTIVITY (20 min.)

Group or Class Mural

Put on the bulletin board a huge circle, square, triangle, and rectangle. Student will put up what he drew - objects that have a circle shape will be put on the bulletin board inside the circle, etc.



LEVEL V OBJECTIVE

Student will perceive the variety and similarities in nature.

LEVEL VI OBJECTIVE

The student will recognize geometric shapes in nature, such as circles, squares, and rectangles.

MATERIALS

Paper and chalk for each student
Huge circle, squares, triangle, and rectangle made out of butcher paper (for bulletin board)
Art paper for outdoor drawing

TEACHER BACKGROUND INFORMATION

You might use this lesson while studying a math unit on geometry.

TOPIC: Observation Skills
SUBJECTS: Art, Soc. St.
EST. TIME: 60 min.
GRADE: 4

AW

LAP MAP

PRE-ACTIVITY (20 min.)

Sketch a map of the school.

1. In less than 10 minutes, while seated, try to sketch a map of the school grounds, locating some outstanding features or landmarks.

2. Use the remaining time to share the results with the class, asking questions about accuracy, meaning of symbols, measurement scale, and ratio of sizes, choice of features and landmarks, information omitted, information communicated.

ACTIVITY (20 min.)

Go outside and observe.

1. Walk with class around the school and grounds, stopping to point out landmarks by asking appropriate questions. (10 minutes)

2. Allow students to stop, sit down outside and sketch a map of the school grounds again based upon the above observations.

POST ACTIVITY (20 min.)

1. Compare the first maps with the latest maps to determine:

   a. Accuracy
   b. Measurement scale and ratio
   c. Choice of features, landmarks
   d. Information gained
   e. Information lacking

2. Discuss how this effort compares with early distorted maps of land made by those who couldn't see it from the air and didn't measure accurately or use compasses for direction, etc.

3. Discuss how this affects your idea of how big your resources are, where they are, and how they are used.

4. Discuss how a good map can be used to do a better job with the above things today.

SUGGESTED ADDITIONAL ACTIVITIES

Using measuring tape, have children measure their pace on a 100 foot measured outdoor course. Use compasses and pace to increase accuracy of map.

LEVEL V OBJECTIVE

1. Student will be able to inventory a given environment (animal and plant population and physical characteristics) and analyze the interrelationships among the various components.

2. Students will understand physical, economic. and human factors involved in land use decisions.

3. Student will comprehend man's rule in eco-repair previously initiated and ongoing, i.e., recycling, rapid transit, organic gardening, pollution control, land use planning.

4. Student will be able to predict future problems and understand man's responsibility for prevention of those problems.

LEVEL VI OBJECTIVE

The student will be able to draw a map of the school grounds.

TEACHER BACKGROUND INFORMATION

Have children cut cardboard boxes into 10" x 12" lap boards. Measuring tape for pacing and compasses may be used if you are familiar with them, but they are not necessary to the success of this lesson. Refer to the guidelines for "Teaching Children Outdoors."

MATERIALS

For each student the following:
Pencil and paper
10" x 12" writing board (cut from cardboard boxes)
Ruler

Materials

TOPIC: Pot Pourri
SUBJECT: Art
EST. TIME: 45-60 min.
GRADE: 4

AW

TWIRLING TWIGS

PRE-ACTIVITY (10 min.)

Nature Walk

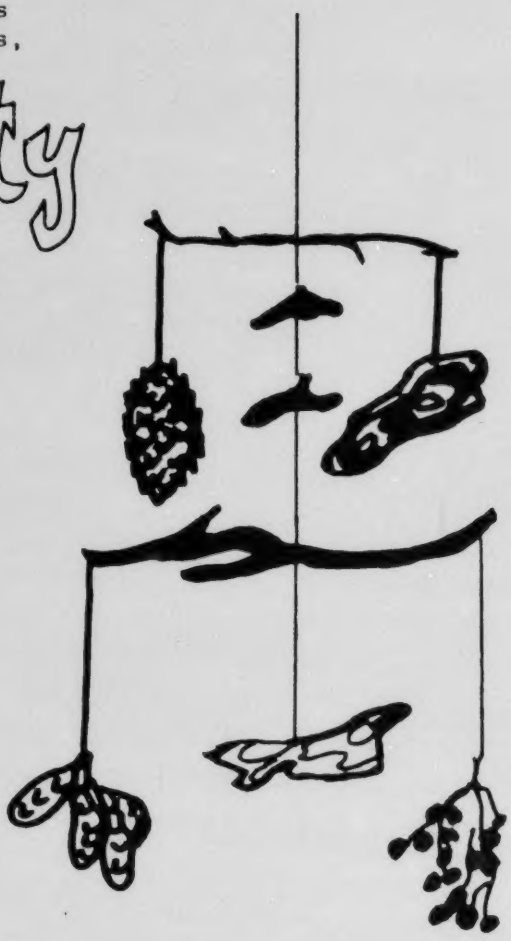
1. Explain how to make a mobile.
2. Students will quietly walk in a wooded area on school grounds looking for and collecting items from the ground such as bark, pine cones, seeds, bits of wood for their mobiles.

ACTIVITY (40 min.)

Activity

Making a Nature Mobile

Using found items, the student will make a mobile, hanging objects from string and connecting items on the string to a stick.



POST ACTIVITY (Home Activity)

Students will find debris from yard at home, construct something creative.

SUGGESTED ADDITIONAL ACTIVITIES

Make little driftwood critters.
Make place mats from leaves and grasses.
Make weed arrangements.

LEVEL V OBJECTIVE

Student will perceive himself as a part of nature and will desire to live in harmony with the rest of nature.

LEVEL VI OBJECTIVE

The student will be able to construct a "nature mobile" using natural debris from his local environment.

Materials

MATERIALS

Stick for each student
Thread or string
Debris from the ground such as bark, pine cones, leaves, seeds, bits of wood, nails of pins.

TEACHER BACKGROUND INFORMATION

It would be good to have examples of mobiles to show to the children.
Have various lengths of string.
Stress balance of objects.

ENVIRONMENTAL ED I.Q.

TOPIC: Pot Pourri
GRADE: 4
EST. TIME: 15-20 min.
SUBJECTS: Soc. St. Lang.Arts

AW

Activity

PRE-ACTIVITY (5 min.)

Discuss:

Ask students: "How much do you really know about your environment?" "See how you score."

Pass out the environmental knowledge test.

ACTIVITY (10 min.)

Take pre-test

1. Which container will create the least waste-disposal problems?

   a. The returnable bottle
   b. No-deposit bottle
   c. Aluminum can

2. Approximately how many motor vehicles will be abandoned this year?

   a. 250,000
   b. 1,000,000
   c. 3,000,000

ACTIVITY CONT'D

3. As much solid waste is created by individuals as by manufacturing.

   TRUE(x) FALSE

4. Litter is one of man's oldest problems.

   TRUE(x) FALSE

5. Approximately how much money is spent each year to remove trash from America's highways, parks, and communities?

   a. $2 million
   b. $7,000
   c. $500 million

6. Your parents help to pay for this.

   TRUE(x) FALSE

7. What kinds of accidents are caused from littering.

   Check: boating, airplane, auto, hiking, forest fires, drowning

8. Paper may take 60 or more years to fully degrade (break down).

   TRUE(x) FALSE

POST ACTIVITY (10 min.)

Give test again at the end of unit.

LEVEL V OBJECTIVE

The student will be able to identify environmental problems, especially in his own local area.

LEVEL VI OBJECTIVE

The student will be able to give correct answers to the "Environmental Ed I.Q. Test".

Materials

MATERIALS

Test - two copies for each child.

TEACHER BACKGROUND INFORMATION

Answers are underlined for test.

TOPIC: Pot Pourri
SUBJECTS: Soc. Studies, Science, Math, Art
EST. TIME: 3 Weeks
GRADE: 4

AW

A PLOT STUDY

Activity

PRE-ACTIVITY (10 minutes)

Defining the Problem

1. Explain to the students in general terms that they will study extensively a small plot of land on the school grounds for the next several weeks.

2. Using page 5 as a guide, ask "What kinds of things should we find out?" Make a list of the questions. Also include "What will you look for in order to find out?" Have students predict answers.

ACTIVITY (3 days, 45 minutes)

Plot Investigation

Day One - Plot selection and mapping of non-living things (see page 3).

Day Two - Observation and mapping of plants (see page 3).

Day Three - Observation and mapping of animals (see page 3).

POST-ACTIVITY (20 minutes)

Tabulations and Conclusions (see page 4).

LEVEL V OBJECTIVE

Students will comprehend relationships among all organisms and their non-living environment.

SUGGESTED ADDITIONAL ACTIVITIES

Do this same study at home or elsewhere. Compare with one done at school. Repeat these three observations (non-living, plants, animals) each Monday for three or four weeks. Compare and contrast data using "After Outing Discussion."

LEVEL VI OBJECTIVE

The student will recognize changes that occur in a small plot of land over a three day period.

MATERIALS

One piece of white tagboard, 12" x 18" for each student; pencil; hand lens; thermometer; rulers; golf tees - four per each pair of students (include one brown golf tee for each pair of students)

TEACHER BACKGROUND INFORMATION

This activity is designed for the spring season. It may be done over several days or weeks. Look over the school grounds to find as many likely spots for this work as possible. Select areas where there is little foot traffic so that the golf tees are unlikely to be noticed and disturbed. Try to select several sites which are somewhat different so that the students will discover the variety of small environments which exist within the larger environment. It is not wise to select plots in a well-cared-for lawn since there is little or no variety of plants. One dozen plants per plot would be ideal. Provide for diversity between plots by selecting an area that is usually sunny, one that is shady during part of the day, and one that is usually always shady. Each student will need a piece of white tag board 12" x 18". The students will be able to use the sheet for mapping the small plot and to keep their worksheets.

CREDITS

"Worlds in Balance" - KTCS-TV

DAILY PROCEDURES

Day One - Selection of Plot and Mapping of Non-Living Things

Divide the class into groups of two. Allow time for the students to read and comprehend their instructions on page 6 (the worksheet). Students must have some common background when they begin their observations. Discuss with the students the qualifications they will look for when selecting a plot. They must understand the illustrations on their worksheets so they are certain how to draw their maps.

Each pair of students selects a plot and marks it with the golf tees. They draw their maps, first locating the non-living parts of the environment. Caution them not to move anything from their plot. They must not touch or disturb anything; they are only to observe and record their findings. Stress the point that sticks, rocks, etc., will help locate the positions of the plants.

After Outing Discussion - To be Held After Each Outdoor Plot Study

1. What did you observe about your plot?
2. What are some of the non-living (first day), plants (second day), animals (third day) you noticed?
3. What effect did weather, location, etc., have on the non-living things? Plants? Animals?
4. After your study, what can you now say about the non-living things, plants, or animals on our school grounds.

Day Two - Plant Mapping

1. Hand out worksheets (see page 7).
2. The students observe plants on their plot. They will draw symbols for each plant on the plot in its proper location. If there is more than one plant of each kind, count them, and write the number inside the symbol.
3. Repeat "After Outing Discussion," page 3.

Day Three - Animal Mapping

The students must approach their plots slowly and quietly so that they can see and observe any flying animals (insects and birds). If any are seen, they should be recorded on their map by sketching. If there is more than one animal of the same kind, count them and record the number beside its sketch.

POST-ACTIVITY

Each student reviews the records of his own plot to find the number of living things on the plot. Tabulate the students' answers on a chalk board form such as this:

STUDENTS	TOTAL LIVING THINGS	PLANTS	ANIMALS
Sam and Margaret			
Bob and Phil			

The students compare the living things on the plots and answer the following questions. They should find that no two plots are the same.

Find the answers to as many of the following questions as you can:

1. How many living things did you find on your plot during the three days?___ _____
2. How many of the things that you found were plants? _____
3. How many of the living things were animals? _____
4. Were the living things exactly the same on any of the two plots of ground that were studied by the class? _____

STUDENT WORKSHEET NAME_____

STUDYING A SMALL PLOT OF LAND

You cannot study all the things on earth. But by studying a small plot of land, you can find answers to questions like these:

1. WHAT ARE THE LIVING THINGS YOU MIGHT EXPECT TO FIND ON A PLOT OF GROUND?

2. ARE THE LIVING THINGS ON THE PLOT ALWAYS THE SAME? OR DO THEY CHANGE?

3. HOW LONG DOES THE PLOT OF GROUND REMAIN THE SAME?

4. WHAT CHANGES DO YOU EXPECT TO HAPPEN TO THE PLOT OF GROUND?

5. WHAT ARE SOME EFFECTS OF TEMPERATURE AND RAINFALL ON THE PLOT?

6. ARE TWO PLOTS OF GROUND LIKELY TO BE THE SAME IN ALL WAYS?

HOW MIGHT THEY DIFFER?

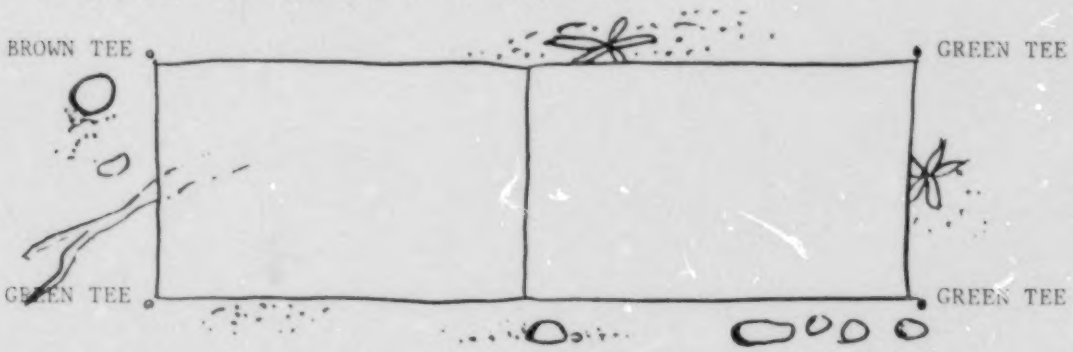
STUDENT WORKSHEET NAME_____

MAPPING A SMALL ECOSYSTEM

The plot of land you will study will be 12 inches wide and 18 inches long. Use a piece of paper 12 inches by 18 inches on which you can make a map of your plot. Fold the paper in the center and draw the map on the inside. The folded map will also serve as a folder for worksheets.

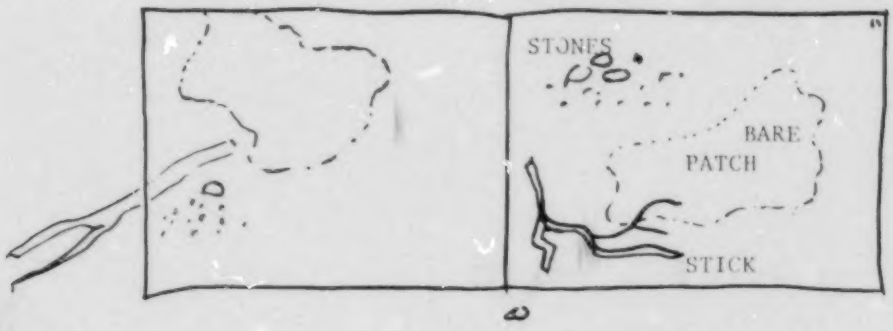
1. Choose a place outdoors which interests you. Pick a plot that has some plants but is not completely covered with them.

2. Hold your special map paper over the plot of ground. Push a golf tee into the ground at each corner of the paper. Remove the paper. The golf tees mark the corners of the area you will be studying. Leave the golf tees in the ground until the unit is finished.



3. Put a brown spot on the map in the corner next to the brown golf tee. This will help you place the map in the same position each time you work on it.

4. On the map, draw symbols to show the non-living things such as stones, sticks and bare patches. Make the symbols the same size and shapes as the non-living things. The non-living things are part of the environment of the living things on your plot. They are also landmarks for locating a spot on the map.



STUDENT WORKSHEET

NAME _____

DANDELION PLANT

GRASS PLANT

PLANTAIN PLANT

5. Examine the plants on your plot. How many different kinds do you find?____

6. Find the names of as many of the plants as you can. Decide on a symbol to use for each kind of plant. You might use symbols like these:

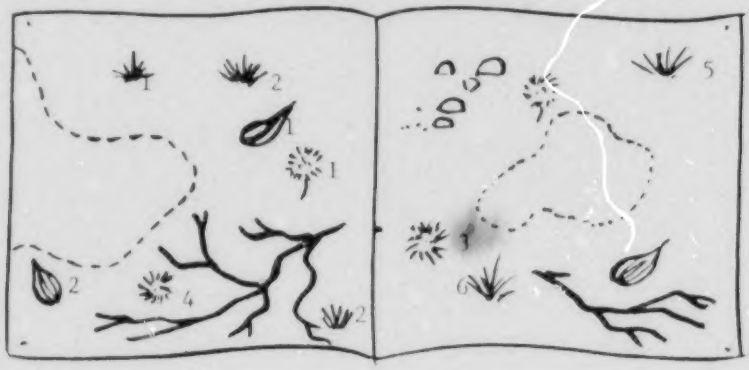
DANDELION

GRASS

PLANTAIN

7. Draw the symbols and write what each symbol means on page of your worksheets.

8. Locate each plant on your map by drawing its symbol. If there is more than one plant of the same kind, number each one after the symbol.



TOPIC: Soil
SUBJECTS: Sci. Lan. Arts
EST. TIME: 40-60 min.
GRADE: 4

EARTH FARM

PRE-ACTIVITY (10 min.)

Investigation Chart

1. Show a picture pertaining to animals that live in the soil. Use this as a starter for a discussion period.

2. Make a chart, similar to this, titled Things We Want to Find Out.

   a. Why do earthworms choose soil for their home?
   b. What do earthworms eat?
   c. What do they do for the soil?
   d. What kind of soil is best for earthworms?
   e. Why don't earthworms live in sand?

3. List what other earth-animal life we might observe on a trip to the woods.

ACTIVITY (20 min.)

Activity

Observation

1. Collect enough soil to almost fill an aquarium.

2. Collect worms in a can, along with some soil.

3. Locate a rotted log. Have children look for animal life. Magnifying glasses are very helpful. (Some animal life may be found are: worms, grubs, snails and slugs, insects, etc.)

POST ACTIVITY (15 min.)

Make an Earth Farm

Fill an old aquarium (to within 4 or 5" from top) with forest soil. Let the children put earthworms into the farm and watch them burrow down into the soil. Completely cover from bright light with black construction paper. A dark place should accelerate burrowing. Keep covered, when you are not watching the worms, and give fresh food every day. Add moisture to the soil. Complete chart of animals observed on trip.

SUGGESTED ADDITIONAL ACTIVITIES

Art - Child could draw a picture of earthworms

Language Arts - Write a story "I've Been Turned Into A Worm."

Math - Make a chart recording and weighing the amount of food the worms eat.

LEVEL V OBJECTIVE

Student will understand composition of soil. (How soil provides homes for animals and how animals help soil.)

LEVEL VI OBJECTIVE

The student will know how earth worms affect the soil they live in.

Materials

MATERIALS

Visual aid picture of animal living in the soil
Paper for chart
1 aquarium
A can to collect worms
Digging shovel
Magnifying glasses
Food for worms (lettuce, cereal, corn meal, rich forest soil, coffee grounds to mix in soil)

TEACHER BACKGROUND INFORMATION

Most of these steps could be done as a whole class.

CREDIT

Environmental Education Activity Resource File - Bellevue Public Schools

TOPIC: Water
GRADE: 4
EST. TIME: 1 hr.
SUBJECTS: Sci., Math, Lang. Arts

AW

CATCH AN AQUABUG

PRE-ACTIVITY (15 min.)

Preparation and Map Work

Task A in classroom. (See page 3 for task card.) Divide students into groups of four. Walk to site.

ACTIVITY (60 min.)

Activity

Stream Study

Stop about 50 feet from stream and do Task B in small groups.
Task B - 10-15 minutes (See P. 3)

Handout collecting equipment. Give directions. Set boundaries.
Task C - 30-40 minutes (See P.3)

Put out enamel pans and pond life books for each group.
Task D - 20-30 minutes (See P.3)

POST ACTIVITY

Discussion

1. What did you notice at the stream?
2. What were some of the animals you observed?
3. Where were some of the places you found them?
4. Why does a (animal) live in the (part) of the stream?
5. What can you say about aquatic animals and streams?

SUGGESTED ADDITIONAL ACTIVITIES

Do Task E (See P. 3)

LEVEL V OBJECTIVE

Student will know about the living factors in fresh water.

LEVEL VI OBJECTIVE

The student will know the types of aquatic life that live in a stream in his local environment.

Materials

MATERIALS

Map of stream and surrounding area - if possible, know boundaries of your watershed. Task Cards A,B,C,D, for each student; 4-5 white dishpans; 4-5 air thermometers; aquatic insect sheets (attached) for each group; 6-8 Golden Nature Guide Pond Life books

TEACHER BACKGROUND INFORMATION

If at all possible, have an adult, teen-ager, or 6th grader to help each group of third graders in using the O_2 kit.

CREDITS:

Char and Ernie McDonald
Oregon State Game Commission

TASK A: (15 minutes) Work in small groups.

Find _____ Creek on the map. Find your location.
Where does the water in this stream come from?
(trace upstream to its source)
Draw lines around the boundaries of our watershed. (We're in the _____ Creek watershed.)

TASK B: (10-15 minutes) Work by yourself or in small groups.

As you approach the stream, observe and record your observations about the stream environment: (can be done visually and verbally)

plants _____

animals _____

air _____

rocks _____

water _____

TASK C: (30-40 minutes) Work by yourself or in groups.

Using collecting equipment (screens, jelly cups, etc.) collect as many types of aquatic animals as possible.
Put them in the white dishpans for observation by the group. (Keep the pan in a cool place)

Contact the instructor when you're finished, to receive the next task.

TASK D: (20-30 minutes) Work by yourself or in groups.

Using the Golden Nature Guide Pond Life books and attached picture keys, generally identify the specimens you found.

List or sketch the animals you found below.

Description of where found	Type (name or sketch)	No.

Return animals to water as soon as finished.

TASK E

Work with your group. (15 - 20 minutes)

List four things necessary for you to live:

1.

2.

3.

4.

List five things you think an aquatic animal needs to live:

1.

2.

3.

4.

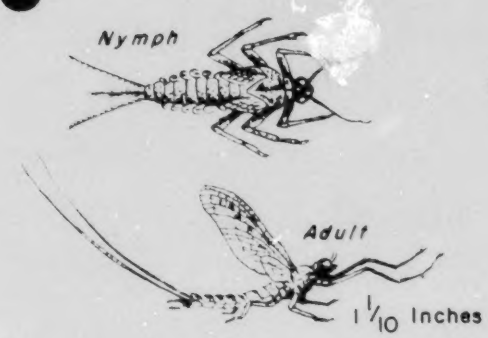
5.

Discussion of Responsibility (Optional)

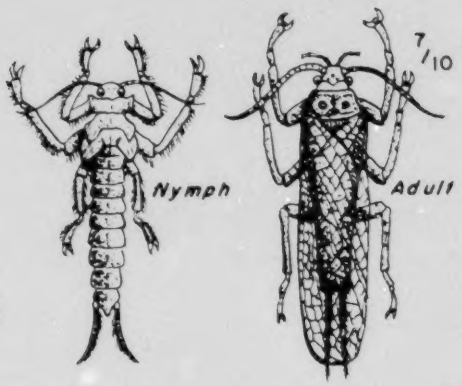
Ask class:

1. To whom do creeks, streams, lakes, etc. belong?
2. Who should keep them clean?
3. How can we protect the plant and animal life in them?
4. Do creeks and streams change? How?

AQUATIC INSECTS

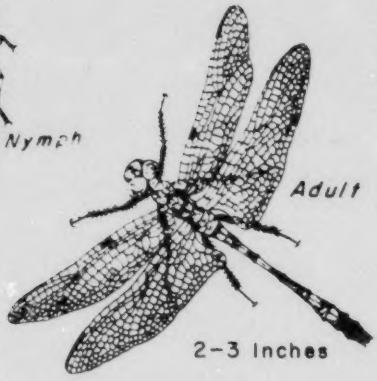


MAYFLY



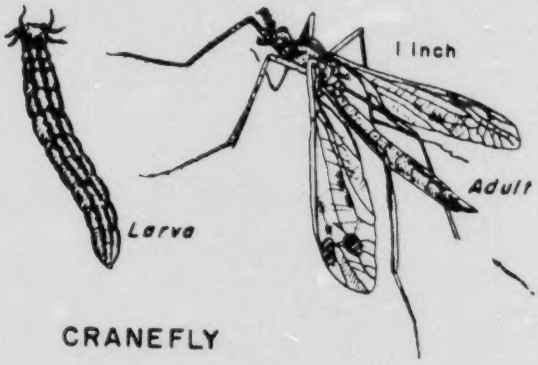
STONEFLY

WATER STRIDER

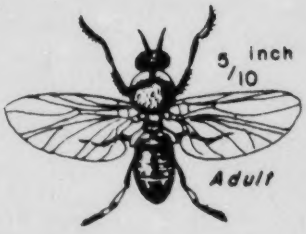


DRAGONFLY

WHIRLIGIG BEETLE

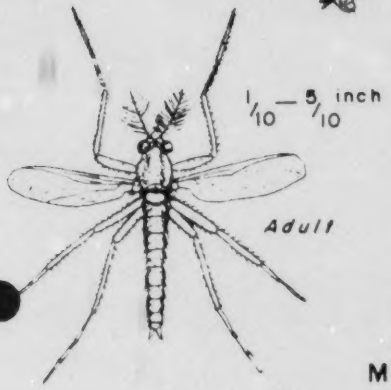


CRANEFLY

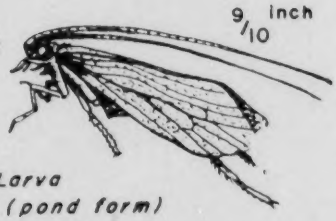


BLACK FLY

MOSQUITO



MIDGE



CADDISFLY

41

WHAT IS A WATERSHED?

TOPIC: Water
SUBJECTS: Science, Soc. Studies, Art, Math
EST. TIME: 1 Hour
GRADE: 4

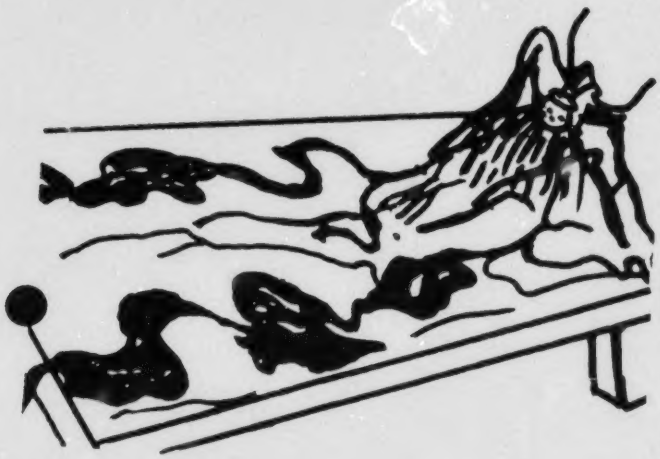
AW

Activity

PRE-ACTIVITY (15 minutes)

Discuss and Define

1. Make an educated guess as to what a watershed is. Write all definitions on board.
2. Have students determine which definition is most accurate by actually making a watershed.
3. Assign duties for collecting materials and making a watershed.



POST-ACTIVITY (10 minutes)

Using attached map, discuss the following:

1. Name some bodies of water in the NE corner of the map.
2. What effect do these have on you?
3. Color the pipeline blue.
4. Color the Sultan River Watershed light green.

ACTIVITY (30 minutes)

Make a Watershed

Seat children in a semi-circle. Call on students to come forward and help at various times.

How to Do It

Shape the aluminum foil to form two adjacent but separate watersheds resembling an irregular land surface as in the illustration. Use the paper to support the foil, shaping the construction over the box or flat, which can then be elevated to exaggerate stream gradient and to make the foil watersheds visible to the class. Create ponds in each watershed by making dimples in the foil. Place a container at the mouth of each watershed.

Place ink or food coloring in the ponds to mark the water from each watershed. This can represent pollution, also.

With the clothes sprinkler or other sprinkling device, simulate rain on each watershed, on the divide between watersheds, and over the entire model. Simulate storms moving across, up and down a watershed and note the effect this has on stream crests, thus demonstrating one of the factors affecting floods.

LEVEL V OBJECTIVE

Students will understand the term watershed in controlling usage of all resources.

LEVEL VI OBJECTIVE

The student will know how a watershed contributes to the well-being of his local environment.

MATERIALS

Materials

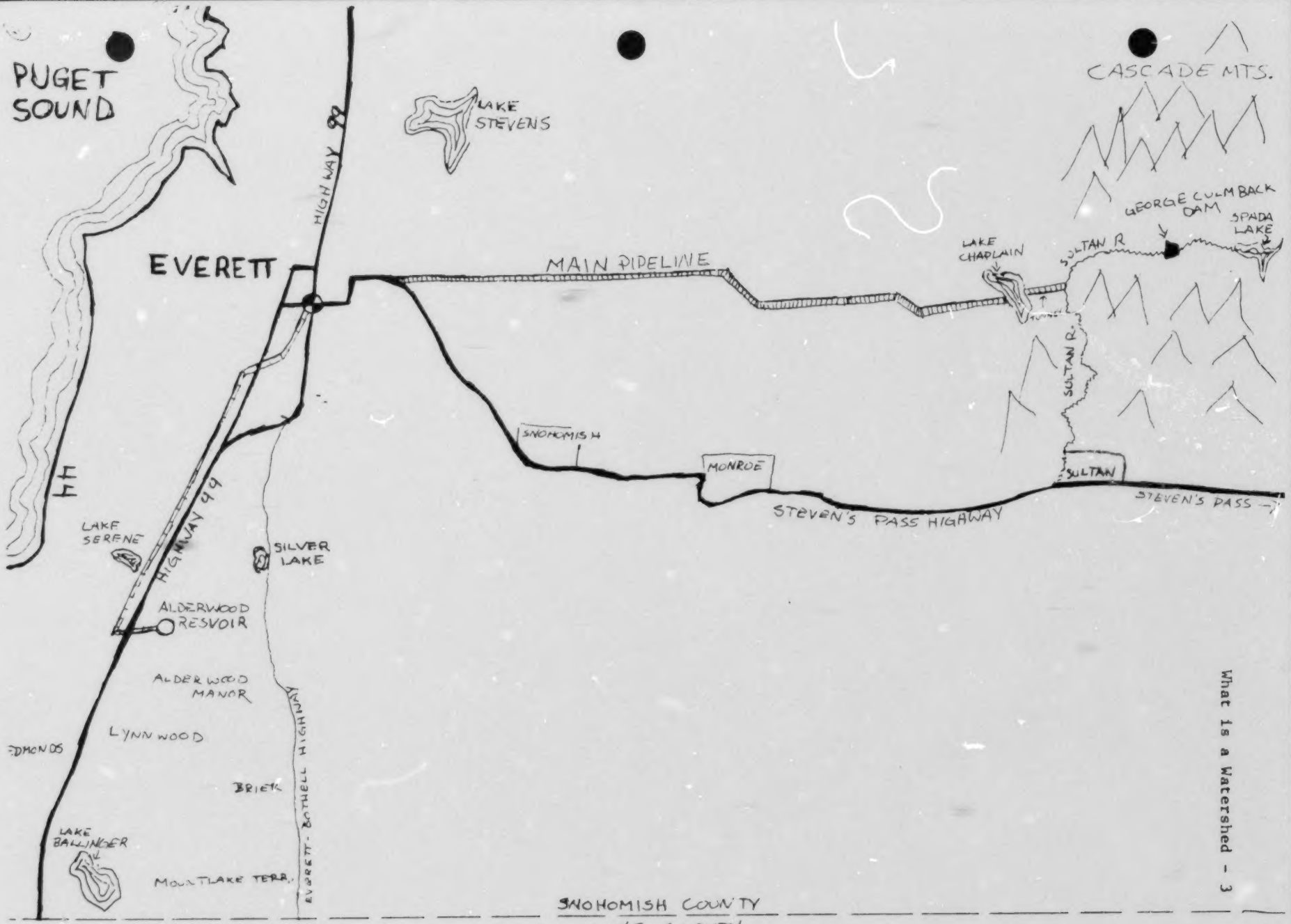
One plant flat or a low-sided fruit crate; several crumpled newspapers; small sprinkling can; two wide-mouthed jars; one piece of 3 x 18" heavy duty aluminum foil.

TEACHER BACKGROUND INFORMATION

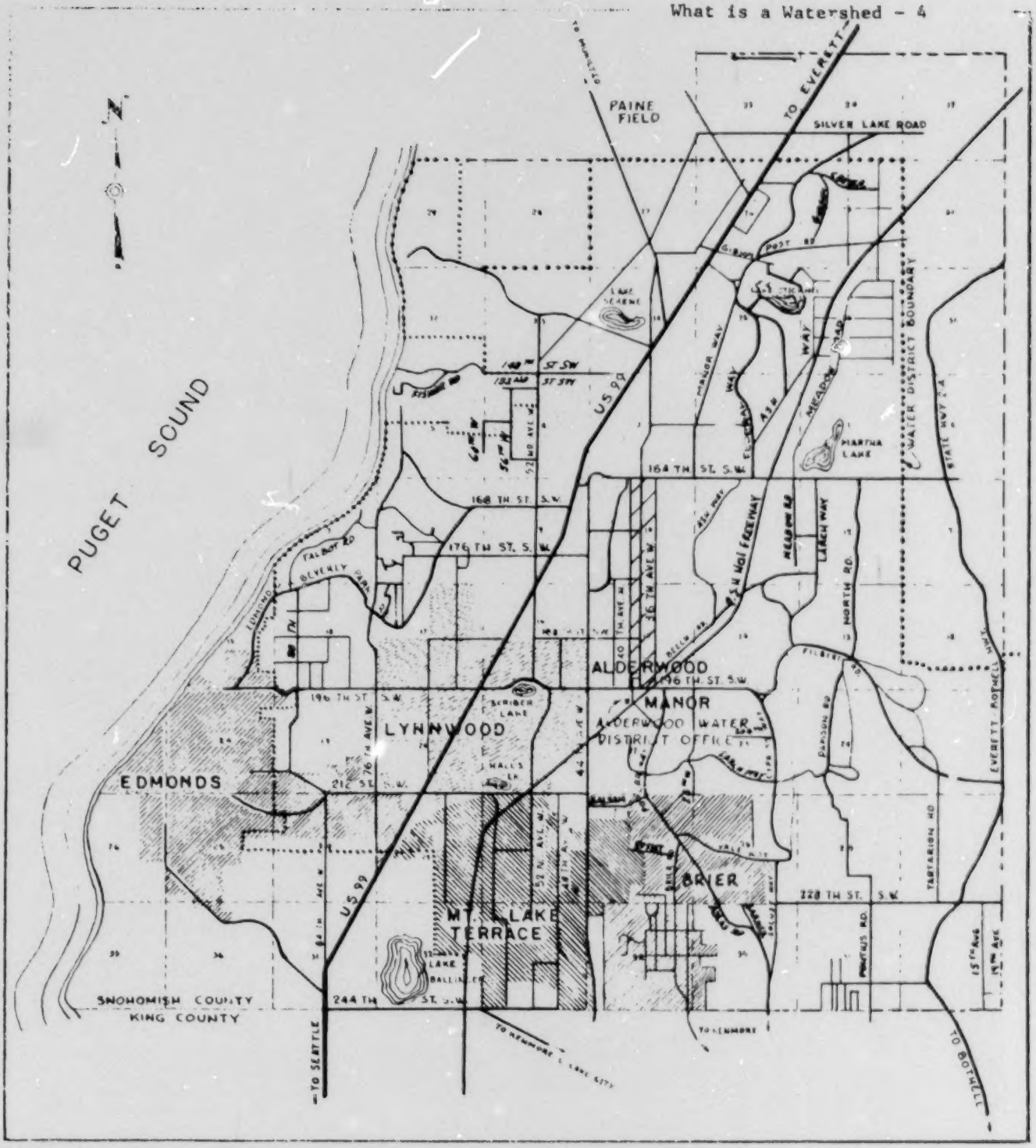
A watershed is nature's unit for drawing water from the land.

CREDIT

"Teaching Science with Garbage," Rodale Press, Inc., 1971.



What is a Watershed - 3



ALDERWOOD
WATER
DISTRICT

ALDERWOOD MANOR
WASHINGTON

JAWS

USE

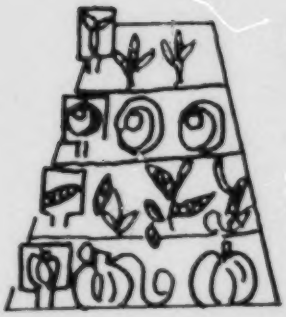
COOL CLEAR WATER

TOPIC: Water
SUBJECTS: Soc. Studies
EST. TIME: 2 Days
GRADE: 4

MU

PRE-ACTIVITY (10 minutes)

Using a magazine find one or 2 pictures where water is being used. Cut it out and put it on the black board.



Activity

ACTIVITY (45 minutes)

1. Teacher says - "From what you know and have read about, what are some specific ways in which Americans use water? List student's contributions. (Be sure to list only very specific uses - see page two for a list of possible uses of water and for a list and labels.)

2. (a) Which of these uses of water could be grouped together because they are alike in some way?

   (b) Teacher asks student for his reasons on grouping - Example: "Why would you put washing dishes and washing clothes together?"

3. Ask for labels for each group. Be sure the labels given follow the reasons given for the grouping in Step 2b.

4. Are there any whole groups that go together?

ACTIVITY - CONT'D

POSSIBLE LIST OF USES OF WATER

Washing dishes
Preparing food
Fishing
Swimming
Sewage
Drinking
Factories - industries
Growing food
Washing clothes
Water skiing
Air conditioning
Toilet flushing
Making electricity

POSSIBLE GROUPS AND LABELS

Recreation

Swimming
Boating
Fishing
Water skiing

Industrial/Commercial

Fishing
Factories
Electric

Agricultural Farming

Grow food
Water for animals

Cleaning

Dishes
Cars
Self
Clothes
Windows

Basic Needs For Survival

Growing food
Drinking water

Water Disposal

Sewage
Toilet flushing
Garbage disposal

POST-ACTIVITY (15 minutes)

Make a list of all the ways you used water for a period of 24 hours and estimate the amount. Decide what you and your family can do to save water. Keep a record of what you did. (See chart at top of page 4.)

SUGGESTED ADDITIONAL ACTIVITIES

1. Field Trip - Visit a water system to find out how mineral content of water is removed or reduced, and how the water is purified.

2. Make a mural of all the activities you can think of that take place on or in the water. (Page 4 - Task Card)

LEVEL V OBJECTIVE

Student will clarify his concept of the purposes for which Americans use water.

LEVEL VI OBJECTIVE

The students will know the many uses for water in their daily life.

Materials

MATERIALS

Butcher paper, felt pen, tape or chalkboard and chalk. A magazine for each child, and scissors for each child.

TEACHER BACKGROUND INFORMATION

This activity follows the TABA thinking strategy of concept development. Expect students to put things in their own words.

SAVE THAT DRIP!

WAYS I USED WATER	APPROX. AMT. I USED	WAYS MY FAMILY & I COULD SAVE WATER	DID WE DO IT?
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

WATER

Water is useful for many things.

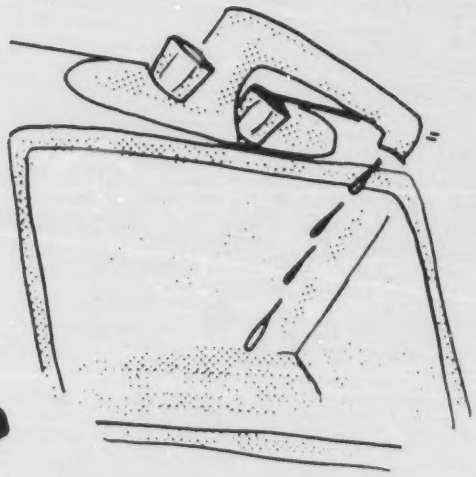
Make a mural of all the activities you can think of that take place on or in the water.

TOPIC: Water
SUBJECT AREAS: Math
EST. TIME: 30 min.
GRADE: 4

MU

WATER WASTE

Activity



PRE-ACTIVITY (10 minutes)

News Article - discuss

Read to the class an article from the newspaper regarding the low supply of water for last summer because of lack of heavy snow in the mountains. Explain and discuss that this happened last summer, but could happen again. How can we not waste water? List ways. (If you don't have an article just discuss that this happened last summer.)

ACTIVITY (On going throughout the day.)

Investigate a leaky faucet.

Collect water from a leaky faucet for a definite period of time in a measured container. If no leaky faucet is available, make one drip by opening it slightly. Have the students time the interval needed for a certain sized flow to fill the container. Repeat the same measurement at least twice to get an average value for the time interval. Have the student then compute from this information the gallons per hour, and gallons per day lost by the dripping faucet.

POST-ACTIVITY (Home Assignment)

Choose one activity to investigate at home.

1. Determine whether a shower or a bath tub takes less water. Take a shower with a plug in the tub. Did you use more or less water?

*2. Put a brick in a toilet tank in order to use less water.

3. Check at home to see if dish or clothes washer is run at less than full capacity.

4. Try using rainfall to clean sidewalks, driveways or car.

5. Water lawn in evening or early morning.

SUGGESTED ADDITIONAL MATERIALS

Our community has many needs for water. Take a class on a field trip to a grocery store, a laundromat, or a restaurant, and observe how they use water.

1. List ways they used water.

2. List ways they might use water that were not seen.

LEVEL V OBJECTIVE

Students will understand problems in controlling usage of water resources.

LEVEL VI OBJECTIVE

The student will know how to determine the rate of water waste caused by a leaking faucet.

Materials

MATERIALS

News article (optional)
Leaky faucet
1 qt. container for water.

TEACHER BACKGROUND INFORMATION

* Teacher might demonstrate amount of water that would be saved by putting brick in toilet. Use a bucket or pail to demonstrate in classroom.

TOPIC: Soil
GRADE: 4
EST. TIME: Begin Sept. or Oct. - do at same time as mold garden
SUBJECT: Sci. L.A. Soc St

MINI LAND FILL

PRE-ACTIVITY (20 minutes)

1. Discuss and collect materials.

2. Ask students:
   a. What are some of the methods of community garbage disposal?
   b. Who has seen or knows about a landfill?
   c. How is a landfill made?
   d. Who can predict what happens to the garbage after it is covered?

3. Have students plan where and how to get materials (clear plastic glasses, aluminum foil, soil, garbage).

4. Divide students into partners.

5. Half of the class should bring inorganic garbage (aluminum foil, broken glass, paper and plastic.) The other half of the class should bring organic materials (nut shell, stale bread, and apple core.)

Activity

ACTIVITY (20 minutes)

Construct a Mini-Landfill

With a partner, students will fill clear plastic container alternately with garbage and soil, burying garbage at different depths and against the inner surface. Leave an inch of airspace at top. Keep the soil moist but not puddled or waterlogged. Cover each container with a piece of aluminum foil folded down snugly.

POST-ACTIVITY

Observe and Record - (15 minutes each Monday)

At the first of each week:

1. Sketch and name the molds (make up a name) on the chart (see pages 4 & 5). Do these differ from those in your mold garden?

When empty spaces appear:

1. Do you notice empty spaces? How can you explain this? Are they truly empty? Is there anything there? What happened to the bulk of the material?

2. Landfills may slowly sink. Why? How? What could a landfill be used for?

Near end of year:

1. Resource person - Garbage Co., etc. (See Jude Petrie, Edmonds Educational Services Center) to find a person to come to your classroom.

2. Discuss:

   a. During the past few months, what things have you noticed about your mini-landfill?
   b. What are some things that are helping the materials decay? and/or What are some possible reasons for these changes?
   c. How do you account for the differences in decomposition between the potato peeling and aluminum foil (etc., compare other items)?
   d. Based on our observation of our mini-landfills, what can we say about decomposition? What can we say about decomposition of logs, plants, animals in nature?

SUGGESTED ADDITIONAL ACTIVITIES

Visit a landfill or dump.

LEVEL V OBJECTIVE

Student will understand decomposition of man-made materials and of natural objects.

LEVEL VI OBJECTIVE

The students will know the effect of the decomposition garbage in a landfill, in particular, mold development and compaction.

Materials

MATERIALS

Clear transparent tall glasses or plastic containers for each pair of students.

Same soil and same garbage items as used in "MOLD GARDEN," (aluminum foil, glass,paper, plastic, banana skins, nut shells, stale bread, apple core, etc.) (Small pieces, no bigger than 1/2" square and about 1/8" to 1/4" thick.)

TEACHER BACKGROUND INFORMATION

Community garbage landfills provide for less aeration than your mold garden and mini-landfill. Garbage, therefore, decomposes more slowly. Sometimes materials have been recovered with little change after 15-25 years. Don't use protein materials such as meat, cheese, or gelatin; they may cause unpleasant odors.

SKETCH WHAT YOU SEE. DESCRIBE WHAT IT LOOKS LIKE.

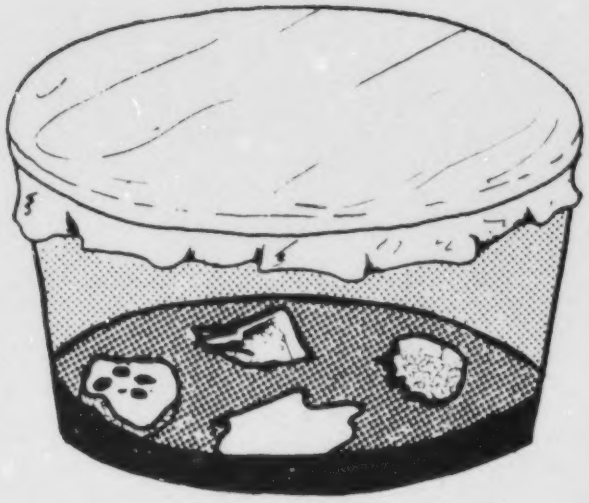
MONTH	BANANA SKIN	NUTSHELL	STALE BREAD	APPLE CORE
SEPT.				
OCT.				
NOV.				
DEC.				
JAN.				
FEB.				
MAR.				
APR.				
MAY				
JUNE				

SKETCH WHAT YOU SEE. DESCRIBE WHAT IT LOOKS LIKE.

MONTH	ALUMINUM FOIL	BROKEN GLASS	PAPER	PLASTIC
SEPT.				
OCT.				
NOV.				
DEC.				
JAN.				
FEB.				
MAR.				
APR.				
MAY				
JUNE				

TOPIC: Soil
GRADE: 4
EST. TIME: On going 2 wks.
SUBJECT: Sci., Lang.A.

MOLD GARDEN



Activity

PRE-ACTIVITY (15 minutes)

Gathering Materials for Discussion

1. Gather materials from home (container, garbage, & transparent plastic.)

2. Show a piece of moldy bread. What do you notice about this bread? Ask: How did the mold get there? What will happen next? After that? Eventually? Let's grow a mold garden and find out.

3. Divide into 8 groups of 4 students each.

ACTIVITY - on going for 2 weeks.

Developing and observing the Mold Garden

1. Place five items (as listed above) on the surface of your soil as shown in diagrams.

2. Seal it with the plastic, held in place with rubber band.

3. Every 3 or 4 days, remove plastic cover and add a little water if soil is drying out.

4. Sketch and describe molds at each observation. (Color, shape, etc.) See page 4.

5. Record date mold garden was planted. Record date each mold appears. As a class, determine length of time necessary to appear.

6. Notice which materials disintegrate quickly and which go to pieces slowly.

POST-ACTIVITY (20 minutes)

Microscope and Compare

1. View molds under microscope.

2. Discuss where mold comes from.

3. While observing, what have you noticed about your mold garden?

   a. What are some changes you've noticed?
   b. What effect has the mold had on the garbage?
   c. After studying your mold garden, what can you say about the mold and its effect on living and non-living things?

4. What you observe in your mold garden is what happens underground. Microbes, earthworms and other forms of life digest and oxidize garbage, and ultimately their own bodies as well.

5. (The end-product is the good rich humus that is largely responsible for the fertility of the soils.)

SUGGESTED ADDITIONAL ACTIVITIES

1. Set up a mold garden with:
   a. rubber
   b. cellophane
   c. plastic
   d. leather
   d. brown paper
   e. paraffined milk containers, etc.

LEVEL V OBJECTIVE

Student will understand decomposition process which takes place in soil.

LEVEL VI OBJECTIVE

The student will understand the effect of mold on organic materials such as nut shells, banana skins, stale bread, and apple cores.

Materials

MATERIALS

1. One piece of moldy bread for motivation.
2. A round metal can or plastic jar, 6-8" in diameter and 3-4" deep, for each group.
3. Thin sheet of clear, transparent plastic and rubber band for each group.
4. Nut shells, banana skins, stale bread, apple core for each group.

Small pieces no bigger than 1/2" square and about about 1/8" to 1/4" thick. Place five items on surface of soil in your can as shown in diagram (Page 8 - Teaching Science with Garbage.)

Microscope

TEACHER BACKGROUND INFORMATION

Don't use protein items such as cheese, meat, or gelatin - they may cause an unpleasant odor. Within a week or two, the molds in your garden may begin to disappear. Small nematode worms may then be seen. These animals feast on the bacteria which grew on the molds and on the molds themselves. One form of life thus replaces another as food supply changes.

KEEP A RECORD OF WHAT YOU OBSERVE

GARBAGE ITEM	DATE PLANTED	DATE MOLD APPEARED	SKETCH	DESCRIPTION	DATE DISAPPEARED
NUT SHELL					
BANANA SKIN					
STALE BREAD					
APPLE CORE					

WE BREATHE AIR?

TOPIC: Air
SUBJECT: Math, Science
EST. TIME: 45-60 min.
GRADE: 4

MU

PRE-ACTIVITY (10 minutes)

Discussion

Breathe 10 times. Ask: What did you breathe into your body? What do you know about the make-up of air? List on the board the students' contributions.

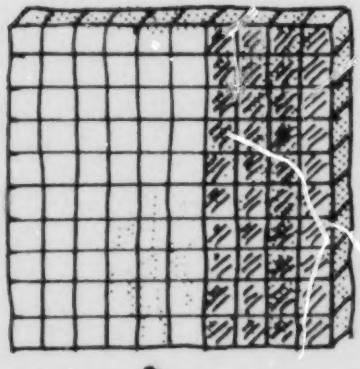
ACTIVITY (20 minutes)

Color Chart

1. Show Table I on an overhead projector and discuss listed elements on the chart. (See page 2)

2. Use ditto to illustrate per cent in Table I (See page 2) Have children color squares to represent per centage.

Activity



POST-ACTIVITY (10 minutes)

1. Show Table II, explain that these gasses vary from day to day and that there are also solids in the air. (See page 2)

2. Look in the newspaper and bring air pollution chart and analyze it. Discuss the chart in class.

LEVEL V OBJECTIVE

Students will recognize various pollution problems, their causes and effects.

LEVEL VI OBJECTIVE

The student will know the percentage of gases such as oxygen, nitrogen, arson, etc. in the air that we breath.

Materials

MATERIALS

The three charts attached on overhead transparency
Ditto with four block charts on it
Color crayons for each student

TEACHER BACKGROUND

TABLE I

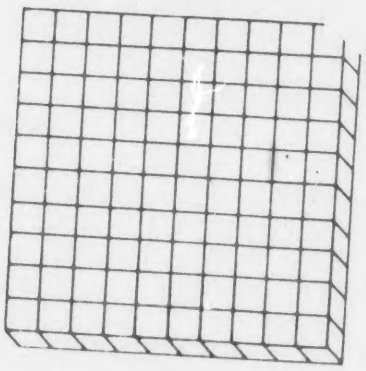
The relative amounts of these gases do not change very much.

GAS	% OF TOTAL VOLUME	PARTS PER MILLION
NITROGEN	78%	780,000
OXYGEN	21%	210,000
ARGON	0.93%	9,300
NEON	0.0018%	18
HELIUM	0.00052%	5.2
KRYPTON	0.00011%	1.1
METHANE	0.00022%	2.2
HYDROGEN	0.00005%	.5
NITROUS OXIDE	0.00005%	.5
XENON	0.0000087%	0.087

TABLE II

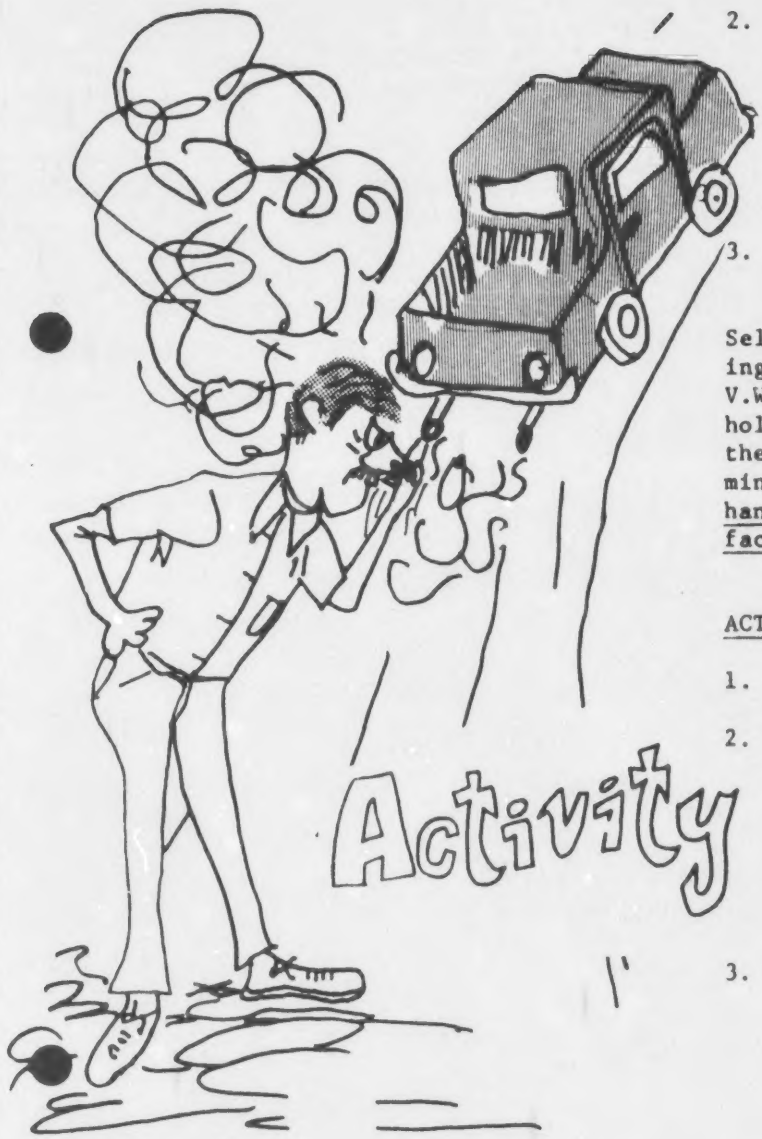
GAS	RANGE
WATER VAPOR	0-70,000
OZONE	0-0.07 ppm
SULPUR DIOXIDE	0-1 ppm
NITROGEN DIOXIDE	0-0.02 ppm
AMMONIA	0-trace
CARBON MONOXIDE	0-trace
CARBON DIOXIDE	100-1000 ppm

BLOCK GRAPH FOR STUDENTS



TOPIC: Air
SUBJECT: Sci., Math, Lang. Arts
GRADE: 4
EST. TIME: 1 hr.

POLLUTION ALA-GO-GO



PRE-ACTIVITY (15 minutes)

Make Collector Papers

1. Make collector papers: Tape a 3" square of white facial tissue to a piece of cardboard. Tape a ruler to the cardboard to be used as a handle.

2. Decide on the vehicles to be tested. Under the tissue write:

   a. Name of car
   b. Approximate year
   c. Type of vehicle
   d. Type of fuel (regular or super?)

3. Divide into groups. Each group should test 2-4 vehicles.

Select different vehicles in school parking lots (bus, 8-cylinder car, V.W., V.W. bus, etc.) While motor is running, hold the collector paper about 6" from the mouth of exhaust pipe for about 1-1/2 minutes. Hold collector paper by ruler handle at arm's length from self. Keep face away from exhaust while working.

ACTIVITY (30 minutes) - Experiment

1. Above

2. Using a hand lens, examine the collector papers. *Record on the collector papers the amount of pollutants, the color of pollutants, and any other observations made. *(As a class, develop a scale of descriptive words, i.e., lightest, lighter, dark, darker.)

3. Using a huge sheet of butcher paper, arrange all of the samples from least amount of pollutants to the greatest.

POST-ACTIVITY (20 minutes)

Chart - Observation

1. Make a graph showing the least amount of pollution to the greatest.

2. Discuss:

   a. What have you observed from this experiment?
   b. Which of your cars seemed to produce the most pollutants? The least?

3. Does there seem to any relationship between the amount of pollution and age of car, type of fuel used, degree to which the motor is warmed up? How can pollution be controlled?

4. From what you've observed and discussed, what can we say about different cars and the amount of pollutants produced?

SUGGESTED ADDITIONAL ACTIVITIES

Write a story of living in a world where you can never take off your gas mask.

LEVEL V OBJECTIVE

Students will recognize various pollution problems, their causes and effects.

LEVEL VI OBJECTIVE

The student will know that various automobile exhaust systems show differences in amount of pollutants.

Materials

MATERIALS

Prepare around 12-15 cardboard pieces, 3" squares of white tissue paper, ruler, and 1 large piece of butcher paper.

TEACHER BACKGROUND

Be sure students hold collector paper by ruler handle and also at arm's length, in order to keep face clear of exhaust.

RUBIC'S SOLVING

TOPIC: Litter
SUBJECTS: Math, Soc. Studies, Lang. Arts
EST. TIME: 70 minutes
GRADE: 4

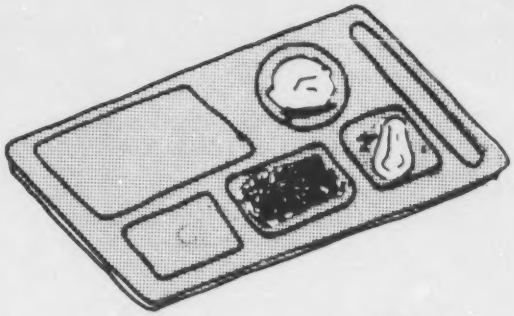
LEFT-OVER LUNCH

PRE-ACTIVITY (10 minutes)

Prepare for Activity

What are leftovers? Name some lunch leftovers. Classify lunch leftovers into groups.

Make a checklist for recording the weight and space of leftovers. Devise a rating scale (from 1-7) from items occupying the largest space to those occupying the least space.



Activity

ACTIVITY (10 minutes per day for 5 days)

Record leftovers on the attached checklist.

POST-ACTIVITY (10 minutes)

Discuss how much was partly eaten food and was wasted. Where does it go? How much waste could be prevented? How can it be prevented? Read about Sarah Cynthia Sylvia Stout (see credits) and discuss student responsibilities for lunch clean-up duty. Establish a table on which children may place unwanted, untouched food (e.g. apples and cookies) for others to eat during lunch time. Discourage the wasteful disposal of whole pieces of fruit or food which has never been unwrapped.

SUGGESTED ADDITIONAL ACTIVITIES

Make a mold garden out of garbage. Rinse containers (cartons and cans); use in the classroom for paint storage, etc. Explore the possibility of diplomatically sending a list home to the parents notifying them of the types and amounts of food wasted by their child at school.

LEVEL V OBJECTIVE

1. Students shall recognize various pollution problems, their causes and effects.

2. The student will be able to identify environmental problems, especially in his own local environment.

LEVEL VI OBJECTIVE

1. The student will know that the amount of solid waste in their classroom can be reduced.

2. The student will be able to determine amounts of solid waste in the classroom.

3. The student will know ways he contributes to and can dispose of solid waste in their own environment.

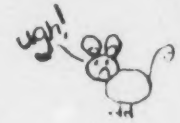
Materials

MATERIALS

A prepared checklist (see p. 3); baby scales, gram weight scales, or health room scales; measuring containers for determining volume (cups, quarts, gallons, etc.)

TEACHER BACKGROUND INFORMATION

This project should last one week. Arrange for access to scales. Supply enough boxes or plastic bags to allow children to separate waste into different groups as they clean their plates. All weights and volume measures should be completed as soon after the noon hour as possible to allow proper disposal of the garbage each day and to avoid any related health hazards.



RESOURCES

Alaska Dept. of Education, Environmental Education Studies.
Silverstein, Shelly, "Sarah Cynthia Sylvia Stout," Fox Eyes, Field Literature Program, Field Educational Publications, Inc., San Francisco, p. 262. 45 r.p.m. record also available at record stores.

WEIGHT AND SPACE TAKEN BY LEFTOVER LUNCH

Day	Milk Cartons	Paper	Plastics	Metal	Solid Food Waste	Liquid Food Waste	Other	Daily Weight Total
	WT.SP.	WT. SP.	WT. SP.	WT. SP.	WT. SP.	WT. SP.	WT. SP.	Weight Space
M								
T								
W								
Th								
F								
Total for Week								

WT. = Weight
SP. = Space

TOPIC: Litter
SUBJECTS: Art, Science, Soc. Studies
EST. TIME: 60 minutes
GRADE: 4

LITTER JAUNT Activity

PRE-ACTIVITY (20 minutes)

Discussion and Directions

Ask "What do you know about litter?" Divide children into pairs and assign areas.

Explain time limit. Distribute bags.

ACTIVITY (10 minutes)

Litter Collection

With a partner, collect all litter possible in designated time limit and area.

Bring to collection area.

POST-ACTIVITY (30 minutes)

Classify Litter, and Art

At collection area, dump bag. Develop classification system and classify litter. Discussion:

1. What kinds of things did you collect?
2. Which of your things was once alive? Which of your things was non-living?
3. Which of your things belong together because they are living? Which belong together because they're non-living?
4. From your collection and our discussion, what can you say about litter?

Each group displays their litter in form of a collage on large cardboard. Display these in school. Some groups might arrange their collage to show groups of living and non-living litter.

SUGGESTED ADDITIONAL ACTIVITIES

Display litter on a bulletin board.
Make a "Litter Critter" - have a contest.
Make a useful item from your litter.

LEVEL V OBJECTIVE

Students shall recognize varous pollution problems, their causes and effects.

LEVEL VI OBJECTIVE

The student will be able to group litter into once-living and non-living catagories.

MATERIALS

Materials

Garbage bag for each two children; large piece cardboard for each two children; glue; tape; staples

TEACHER BACKGROUND INFORMATION

Teacher must be familiar with area for assignment tasks.

Classification could be divided into living, non-living, etc. Living things are now, or once were, living. Non-living things were never alive.

TOPIC: Litter
SUBJECTS: Lang. Arts, Soc. Studies
EST. TIME: 30 minutes
GRADE: 4

PRE-ACTIVITY (Home assignment)

Useless Items

Student will collect and bring to class something that they think is useless or worthless.

WASHED - UP

Activity

ACTIVITY (20 minutes)

Debate - Discuss

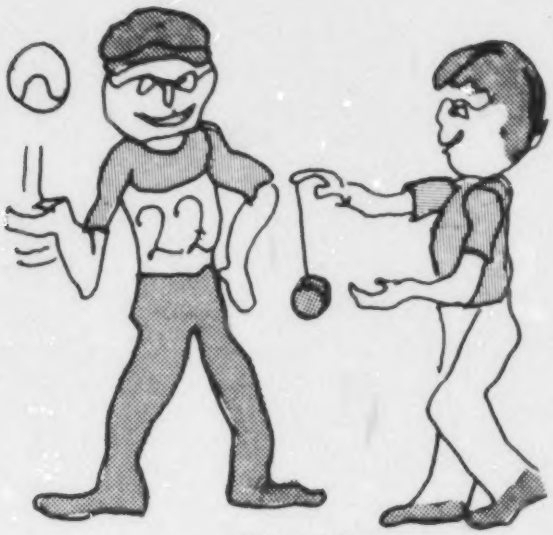
Each student will present a speech trying to prove that their "something" is worthless.

After presentation, the class may differ and debate with speaker by listing possible uses for them.

POST-ACTIVITY (20 minutes)

Reclaiming a Once Used Object

Divide into groups. Select a "worthless object" and transform or create it into something that could be useful.



SUGGESTED ADDITIONAL ACTIVITIES

Instead of using just one useless object, groups could combine 2 or 3 "useless" objects and make them into one useful object.

LEVEL V OBJECTIVE

The student will comprehend man's rule in eco-repair previously initiated and ongoing, i.e., recycling, rapid transit, organic gardening, pollution control, land use planning.

LEVEL VI OBJECTIVE

The student will learn that some things labled as junk can be converted to useful objects.

MATERIALS

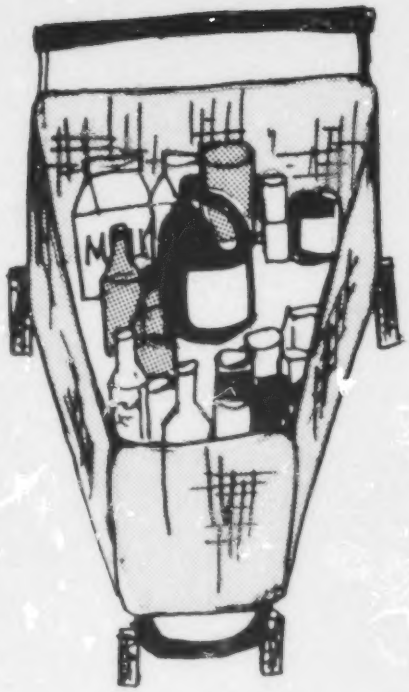
Useless object; scraps of material; glue; blackboard, chalk (optional); "found" objects

TEACHER BACKGROUND INFORMATION

Have speeches remain short; keep discussion short, also.

TOPIC: Litter
SUBJECTS: Science, Lang. Arts, Soc. Studies
EST. TIME: 70 minutes
GRADE: 4

SUPERMARKET



PRE-ACTIVITY (10 minutes)

Discuss Food Packaging

What are the types and characteristics of food packaging?

1. Paper
2. Plastic
3. Glass
4. Metal

Devise a brief checklist for collecting information about food packaging in a grocery store.

Activity

ACTIVITY (45 minutes)

Visit a Supermarket

Observe methods of packaging in different sections and list according to a checklist devised by the students.

POST-ACTIVITY (15 minutes)

Write Reports

1. Divide into groups, one for each type of packaging.
2. List advantages and disadvantages of each.
3. List suggestions for change.
4. Ask students to request containers causing the least amount of pollution or resource problems, when they have a choice while shopping with their families.

SUGGESTED ADDITIONAL ACTIVITIES

Collect recyclable containers in the room and contribute them to the nearest recycling center, or help initiate a recycling center in your area.

LEVEL V OBJECTIVE

1. Students shall recognize various pollution problems, their causes and effects.
2. The students will know means of affecting change to environmental problems.
3. Students will demonstrate constructive and cooperative action in the maintenance or improvement of the local environment.

LEVEL VI OBJECTIVE

The student will learn that some grocery store containers are recyclable or non-polluting and that others are not.

Materials

MATERIALS

Pencil and paper

TEACHER BACKGROUND INFORMATION

Call in advance to arrange a field trip to a neighborhood supermarket. Refer to guidelines for Teaching Children Outdoors.

TOPIC: Litter
SUBJECTS: Art, Lang. Arts, Soc. Studies
EST. TIME: 60 minutes
GRADE: 4

STREET FURNITURE

PRE-ACTIVITY (20 minutes)

Observation

Observe the people on your "selected street." Record their actions.

Observe the street furniture on your "selected street." List places where street furniture is needed: Street lights, telephone booths, benches, litter baskets.

ACTIVITY (15 minutes)

Fold a paper to make 5 columns. At the top write: Street Furniture.

At the top of each column write: For Convenience; For Making it a Safe Place; For Play and Exercise; For Keeping the Place Clean; For Decoration. In the columns list the street furniture that is used in your neighborhood.

Instead of giving the student the topics for the columns, they could come up with their own classification.

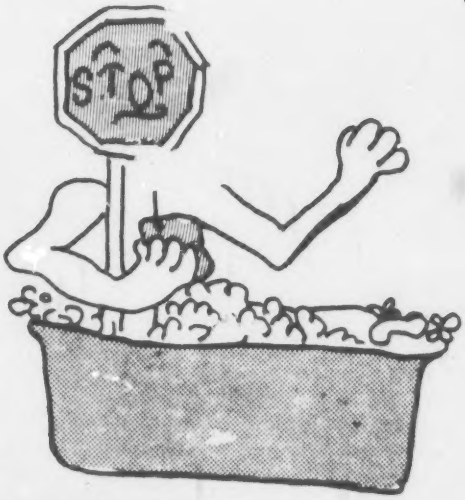
This lesson could be expanded to include yard furniture.

POST-ACTIVITY (30 minutes)

1. List all the broken street furniture in your neighborhood. Then write a letter to someone whose job it is to repair street furniture. Ask him to fix yours. Be sure to include your name and address, and the location address of the furniture to be repaired.

2. Invent a piece of street furniture. Tell what its use is.

Activity



LEVEL V OBJECTIVE

Street furniture has uses, can be beautiful, and sometimes needs repair.

LEVEL VI OBJECTIVE

The student will know the names and locations of street furniture in his local environment.

Materials

MATERIALS

Paper and pencil for each student.

RESOURCES

1970 W.G.B.H., Educational Foundation.

TOPIC: Litter
SUBJECTS: Science, Soc. Studies
EST. TIME: 50 minutes
GRADE: 4

PRE-ACTIVITY (10 minutes)

1. What do you know about leaves?
2. What happens to leaves that fall to the ground naturally?
3. How can man dispose of leaves?
4. Of what value are old leaves to man?
5. What recommendations can we make for better use or disposal of leaves?
6. Who would like to volunteer for a group to investigate leaf disposal in your community?

ACTIVITY (30 minutes)

Interview

Suggested questions for the committee:

1. What volume and weight of leaves does the city handle each year?
2. What is the cost of leaf collection?
3. What is done with them when collected?
4. How could we compost leaves and where?
5. How much could be used by the department of Parks and Recreation?
6. How much could be used around the school yard?

POST-ACTIVITY (10 minutes)

1. Discuss the decomposition of leaves and their relationship to creating humus to enrich the soil.
2. Discuss ways and places available for creating a community compost pile.

SUGGESTED ADDITIONAL ACTIVITIES

Establish a community compost pile on the school grounds. Have children plan and construct the pile.

LEVEL V OBJECTIVE

1. Students will understand the composition of soil.
2. The students will know means of affecting change to environmental problems.
3. Students will demonstrate constructive and cooperative action in the maintenance or improvement of the local environment.

LEVEL VI OBJECTIVE

1. The student will recognize the value of leaf debris in soil building.
2. The student will know ways to dispose of leaves ecologically, such as constructing school and home compost piles.

Materials

MATERIALS

Take a notebook and pencil for information.

TEACHER BACKGROUND INFORMATION

Contact the School Building and Grounds Department for your school, City Parks and Recreation, and/or the Street Department.

1. Arrange for interview with small committee of students.
2. Plan a list of questions from those suggested.

TOPIC: Litter
SUBJECTS: All
EST. TIME: 1 hour, 50 minutes
GRADE: 4

HUMPTY DUMPTY

PRE-ACTIVITY (10 minutes)

What's a Dump?

1. Where is the city dump? How large is it (call and inquire)?
2. How long will it be until it's filled?
3. What are some things that take up a lot of space?

Activity

ACTIVITY (1-1/2 hours)

Visit a Dump or Landfill

1. List the most common types of trash seen.
2. Determine which take up the most space.
3. Describe how you feel about the area's sights, sounds and smells.

POST-ACTIVITY (10 minutes)

Determine the rate of fill.
Determine new areas considered as possible land fills.

SUGGESTED ADDITIONAL ACTIVITIES

Spin-off into a detailed investigation and study of the problems in your community using the resources listed below.

LEVEL V OBJECTIVE

Students shall recognize various pollution problems, their causes and effects.

LEVEL VI OBJECTIVE

The student will know the kinds of refuse that require the most space at the local dump.

Materials

MATERIALS

Pencil and paper

TEACHER BACKGROUND INFORMATION

Call and arrange for a field trip to the dump.

RESOURCES

LET'S DUMP THE DUMP - U.S. Environmental Protection Agency.

RECYCLING - Rodale Press

TOPIC: Litter
SUBJECTS: Math, Soc. Studies
EST. TIME: 25 minutes
GRADE: 4

WHERE IS IT?

Activity

PRE-ACTIVITY (10 minutes)

Before lunch, collect one pound of litter from the classroom waste paper basket.

ACTIVITY (10 minutes)

Burn Trash Outside

Burn trash outside in a screened, enclosed container and carefully collect all the residue in a lidded container and weigh it.

POST-ACTIVITY (10 minutes)

Compare

1. Subtract the weight of the residue from the original one pound weight to determine the weight of materials which have been transformed and sent into the air as gas or solid materials.

2. Discuss the significance of putting waste materials in the form of gas into the air.

SUGGESTED ADDITIONAL ACTIVITIES

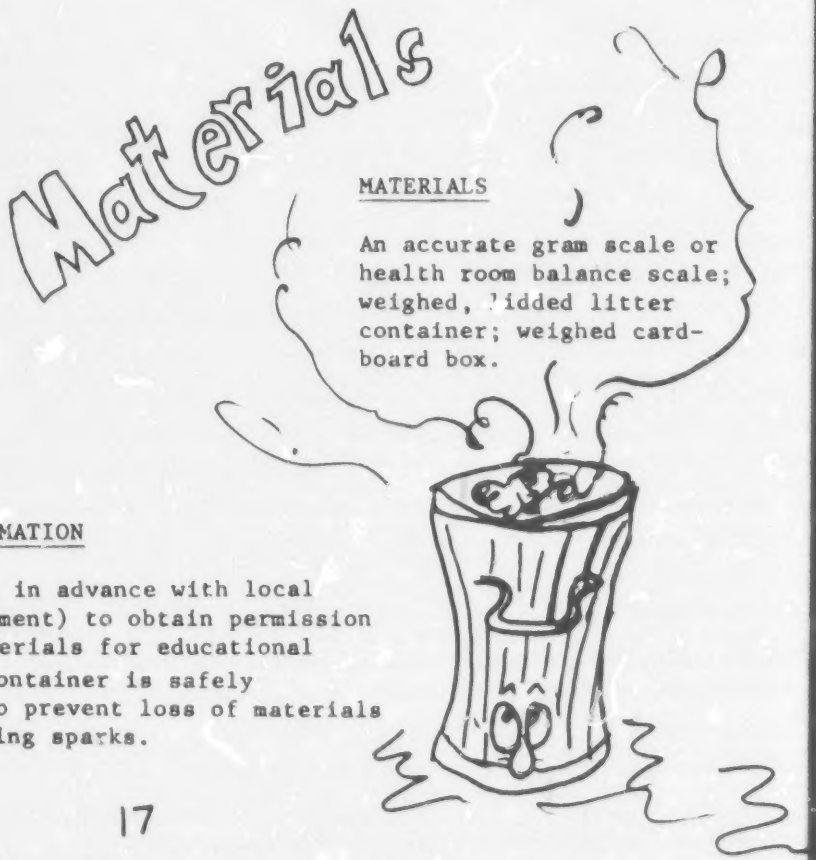
Discuss alternatives to creating waste paper and take appropriate actions.

LEVEL V OBJECTIVE

1. Students shall recognize various pollution problems, their causes and effects.
2. The student will be able to identify environmental problems, expecially in his own local environment.
3. Students will demonstrate constructive and cooperative action in the maintenance or improvement of the local environment.

LEVEL VI OBJECTIVE

The student will know that the burning of trash releases gas and solid materials into the air.



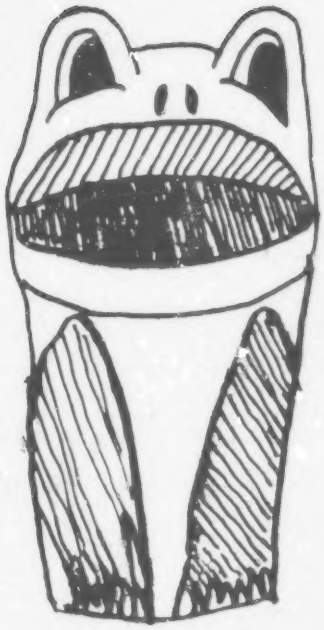
MATERIALS

An accurate gram scale or health room balance scale; weighed, lidded litter container; weighed cardboard box.

TEACHER BACKGROUND INFORMATION

It is necessary to check in advance with local authorities (fire department) to obtain permission to burn these sample materials for educational purposes. Be sure the container is safely covered with screening to prevent loss of materials as well as to reduce flying sparks.

TOPIC: Litter
SUBJECTS: Art, Soc. Studie
EST. TIME: 2 - 3 Weeks
GRADE: 4



LITTER CRITTERS

PRE-ACTIVITY (20 minutes)

Plan and Design Litter Containers

Discuss clever animal creatures with big mouths.

Measure tops of standard-sized trash cans in rooms, hallways or outdoors and decide how to design a top so that it fits properly.

Decide upon and assign students to make certain animals for certain barrels.

Activity

ACTIVITY (Several Class Periods)

Make Papier-Mache Animal Heads

Be sure the mouth opening is large enough for trash.

Be sure the head is not so top heavy that it tips over the basket.

Be sure the shellac coating is thick enough to be able to wipe clean with a damp cloth.

POST-ACTIVITY

Place them on trash containers located around the school.

SUGGESTED ADDITIONAL ACTIVITIES

Survey areas, then analyze and compare amounts of litter collected before and after this project.

LEVEL V OBJECTIVE

Students will demonstrate constructive and cooperative action in the maintenance or improvement of the local environment.

LEVEL VI OBJECTIVE

The student will be able to construct a "Letter Critter" to use with a waste-basket.

MATERIALS

Chicken wire; paint brushes; shellac; newspaper; plastic spray fixative; wheat paste; paper towels; yardsticks; tempera paints; assorted sandpaper

TEACHER BACKGROUND INFORMATION

It is necessary to know the techniques of working with papier-mache as well as to carefully design the object on paper before you begin.

Tear newspaper into long strips, two inches wide. To achieve a strong, durable, hard finish, dip them into a thick syrup of paste and water and apply tightly over pie-shaped chicken wire. Allow matting to dry one day between layers. Paper toweling strips can be added as a last layer. Drying and sanding is then necessary before sketching an outline of facial features and then painting the head. Spray with a plastic fixative to keep the colors from running. Finish by applying two coats of shellac for a water-proofed, glossy smooth, wipe-clean finish.

TOPIC: Litter
SUBJECTS: Soc. Studies, Lang. Arts
EST. TIME: 80 minutes
GRADE: 4

LITTER LETTERS

PRE-ACTIVITY (30 minutes)

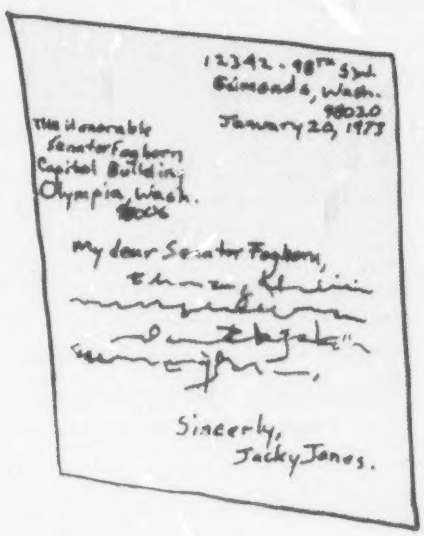
1. In small groups, prepare a mini-skit for the theme "Truth or Consequences," as related to litter. Present skits.

2. Predict present and future litter laws and penalties.

ACTIVITY (30 minutes)

Resource Person in Classroom

Speaker will give information on present and proposed litter control laws, and what effect these have had, or will have.


12342 - 98th St.
Edmonds, Wash.
98020
January 20, 1973

The Honorable
Senator Fogborn
Capitol Building
Olympia, Wash.
98504

My dear Senator Fogborn,

Sincerly,
Jacky Jones.

POST-ACTIVITY (Two 20-minute periods)

Litter Letters

Write a letter (with a partner, as a class, or in small groups) to a local legislator, urging support for anti-litter laws and penalties.

Proofread carefully. Teacher corrects. Then write final copy and mail.

LEVEL V OBJECTIVE

The students will know means of affecting change to environmental problems.

LEVEL VI OBJECTIVE

The student will learn to write letters dealing with anti-litter laws to their legislators.

MATERIALS

Consult your district's Coordinator of Community Volunteers.

In Edmonds School District, contact Jude Petrie, Educational Services Center, Lynnwood, WA 98036

TEACHER BACKGROUND INFORMATION

Have the skits show a situation where a child did something wrong and had to pay the consequences in relation to littering.

TEACHING CHILDREN OUTDOORS

Guidelines for Conducting a Field Trip

I. PRE-TRIP

A. LOGISTICS

PREPARING TO USE AN ENVIRONMENTAL STUDY AREA

Visit the site yourself first in order to have the best control of the situation and anticipate some of the difficulties or logistics questions that could arise. Examine the area carefully and know your trails. This one step can make the difference between a successful and a chaotic trip.

Is there room for your thirty active children? Are there problems of access? Will the children be able to see? You should obtain permission in advance if you plan to bring your class into a private area.

Organization and planning is essential. How far is it? How long will it take? What is needed (water, lunch, other equipment)?

RULES AND RESPONSIBILITIES

Before the trip, have the children join you in deciding on a set of rules and conduct based on the suggestions listed under the Activity Section. Try to keep the rules "do" rather than "do not." They should include most of the following:

1. Always keep the teacher within sight and sound.
2. Stay behind the leader and at a sufficiently safe distance from one another and dangerous areas. (Proper distance can be measured safely and conveniently by the students in terms of "body length.")
3. Always watch and listen for the teacher's signal to pay attention and gather together.
4. Try to leave the place in as good, or better condition, than you found it. Replace everything you move. Avoid stepping on plants and animals whenever possible.

PREPARE FOR EMERGENCIES

1. What are the health and safety hazards? Include a First Aid Kit and water, if necessary.
2. Remind students to dress properly for the weather and type of activity planned (e.g. hats, raincoats, wading boots, etc.)
3. Children should be warned that they are to avoid picking up any plant or animal about which they are in doubt (see guidelines for collecting specimens). Students should not taste or eat anything without first checking with the leader.
4. If you teach in an area where there are poisonous plants, snakes or insects, be sure that you and the children recognize the poisonous

4. (continued)
species. Then they should also know poison ivy, poison oak and poison sumac and avoid them.

USE OF ASSISTANTS OR PARAPROFESSIONAL AIDES

1. High School Teachers' Aides: If you have a high school teacher aide, why not divide your class in half and plan together to let him/her help in certain phases of teaching outdoors (within sight and sound of your supervision).

   More information about the availability and assignment of high school student teachers' aides for classwork and or field trips may be obtained from the high school Counseling Office in each high school.

2. Intermediate and Junior High School Students: Depending on the time and difficulty of your particular outdoor activity, you can depend upon junior high and even intermediate students to conduct simple 10-15 minute exercises outdoors with small groups of younger students. It is mutually beneficial if properly planned and supervised. Contact the Counseling Office in each school for aides.

   Parents: Find a parent who is willing to assume an active role in assisting you with learning activities outdoors.

   Also, why not organize parent work parties after school to improve outdoor laboratories for learning on or near elementary school sites?

4. Docent Aide Programs of Community Organizations: For further information, contact your school district's Coordinator of Community Volunteers.

B. LESSON PLANNING

AREAS AVAILABLE FOR USE

A. School Site: Your own school site is rich in opportunities for environmental observation, learning, beautification, and improvement.

When you have seen your own school site, why not schedule a field trip to another school site?

B. Neighborhood Parks: Check your city map and plan a hike to the nearest park or public natural area. What are its unique characteristics and experiences for learning?

C. Special Attractions: Included here are areas such as Marshall Outdoor Laboratory, Chase Lake Bog, State and National Parks and Forests and other public or private areas permitting your use for education.

PREPARE THE GROUP IN ADVANCE

Where to Go

The first prerequisite for a site is that it provide what you want the children to see or do. The closer it is and the easier it is to get to, the better.

First, the teacher must become acquainted with the descriptive features of the area and with its significance. But you should go beyond merely identifying the flora and fauna or the outstanding physical features of the facility. You should take a close, analytical look around the site and decide which of its characteristics are relevant to people and environmental education in terms of your subject or discipline.

When you find something interesting, tie a piece of yarn near to it to help you find it when you want to show it to the rest of the class.

A. Motivation: Discuss the purpose of the trip with the class beforehand. If the children don't know what to look for, they will become bored and restless quickly. If they are absorbed in a problem, they may maintain interest for a long time. You should know what you want the children to look for before you start out, even if it is stated in only the most general terms.

Be prepared to cover at least some of the field trip objectives given to you by your group during your planning sessions.

B. Materials: Take as little as possible with you; the less equipment, the better. What you decide to take depends on the purpose of the trip. You may want the children to have pencils and notepads. Pieces of yarn can serve as markers for interesting discoveries made by the children. Magnifiers, maps or compasses may be very useful, but you risk loss or damage.

If you want to have them along, take as few as you can and put each one in the specific care of a responsible child.

If you intend to collect specimens, you will need appropriate equipment such as plastic bags,etc. You may also want to carry a camera. Collecting on the site is done only with special permission and is generally discouraged; therefore, bottles, nets, traps,

or other cumbersome and often dangerous paraphernalia should be left at home. Students saddled with the responsibility of comprehensive notetaking or with long checklists of things to observe, are often so busy recording and searching for specifics that they rarely get the big environmental picture.

Reference materials to aid in identification are handy, but not so essential that the expedition be weighted down with them.

The on-site experience should be primarily observational. Work best accomplished in the classroom, such as research, calculations, and more academic studies, should not be attempted at the environmental study area, but rather left to the post-site lessons back in the classroom.

The best guides as to what to take along are the activities most suited to the site and the subjects to be studied there. 1) If the on-site experience is to include identification of objects, the pre-site studies should include enough information so that the students know what to look for. 2) If, on the other hand, the on-site experience is to allow the students the excitement of making discoveries, there should be enough guidance - in the form of pertinent questions - to direct their observations toward the given goal. 3) When the environment is to be used as a vehicle for discussion, as in a social science field study, there should be a predetermined understanding of what environmental on-site observations will best motivate the students.

4) A research trip, though open-ended and allowing students a great deal of freedom, should have specific learning objectives.

II. ACTIVITY

A. LOGISTICS

1. Review your student-made rules and define your boundaries with easily recognized landmarks.

2. Explain that this is an outdoor classroom, and that the students should act like students.

3. Ask students to go to the restrooms and get a drink of water before the trip starts.

4. Explain that you will raise your hand to get the group's attention while on the trail. This should serve as an automatic signal for them to stop where they are and remain quiet.

5. When students see or hear the established signal, they should immediately gather around the teacher or in a semi-circle around a point of interest.

6. Whistles are disturbing to children, other groups, and wildlife and should not be used except in an emergency when everyone is called to assemble and return to the school at once. In such a case, the children should be taught to recognize one internationally accepted signal for distress, which is three short blasts on a whistle.

7. There are occasions, depending on the nature of the trip, when the "Buddy System" works just as well on field trips as at the waterfront.

8. Before leaving, have students count off. Before returning from the field, count off again.

9. The teacher or another adult who is familiar with the area should lead the group. Any other arrangement must remain in control (sight and sound) of the adult leader at all times.

10. It is most essential to have a responsible person at the rear at all times.

11. Have students play follow the leader, in single file, when you want to arrange them in a semi-circle around a particular point of interest.

12. Be quiet and move slowly so that you do not disturb the creatures that live there.

13. Watch the length of the line. Don't make the trip a marathon. Move out rapidly at first, and then proceed according to the group's ability. Pace is determined by the slowest walker. Don't make walking a chore. Change the speed of your pace occasionally. It helps to maintain interest.

14. Always remember to stay on the trail, watch your feet, display good outdoor manners and practice good conservation.

15. Keep stops short. When choosing resting places, try to find an interesting site to accommodate the group: A hilltop or hillside with a panoramic view; a stream or lake side; beside a gravel pit; at the dooryard of an abandoned farm;

15. (continued)
at the edge of a forest. Avoid poisonous plants. While resting, check on the condition of your students, as well as cameras, compasses, sketch pads, and exchange of information.

16. Try a different route if a return trip to the starting point is necessary. It helps to keep up interest.

17. Conclude the trip on an interesting note.

B. LESSON PLANNING

TEACHING TECHNIQUES

1. Involve the group actively during the trip as much as possible. Emphasis should be placed on doing. Look for things you have talked about. Emphasize self discovery. Allow time for free exploration. Encourage individual curiosity, investigation and sharing of discoveries with the rest of the group. Encourage use of all five senses whenever possible. Encourage the children to taste, smell, hear and see.

2. Avoid talking about something while on the trail until the entire group has caught up and you have their attention. If possible, try to get the group around you before you start talking.

3. Project your voice. Lift chin up and talk up and over those in front, when the group cannot gather around you but is strung out in a long line. Direct your voice to the last person in the line.

4. Watch your vocabulary, especially natural history and conservation jargon which may be new to the children.

5. Avoid identification for its own sake. Identification and uses of plants and materials helps, but it is not necessary to be a walking encyclopedia. Even Indians did not know all of the oaks, but they knew which acorns were good to eat.

6. Repeat out loud questions directed to you from the group so that everyone hears the question.

7. Talk conversationally. Lecture as little as possible. Ask leading questions to stimulate participation. Answer a child's question with a question which will guide him toward giving the correct answer himself. Don't, however, belabor this technique. Don't bluff. If you can't answer the question, say so, then suggest that the student investigate the resources for an answer.

8. Make it exciting. Be enthusiastic even over something you have noticed before. Remember, to the group it is new. Maintain a feeling of adventuring. Remember that there can be a significant difference between excitement and learning. Excitement should be delicately channeled toward interest. If you become the eyes and ears of your inexperienced charges, you will soon find that your sensitized students will serve as additional eyes and ears for you. They will call to your attention things that you would ordinarily overlook.

9. Prepare for surprises. Take advantage of teachable moments! If a child discovers something exciting, stop what you are doing, if possible, even if what the child wants to share with the group has little or nothing to do with whatever subject you are covering, and allow him to talk about his discovery. You can direct the group's attention back to your subject later. Use tact in keeping the students' facts straight to avoid discouraging self-expression. Avoid getting off on a tangent for very long, unless you all agree that a new study area is more important than the original purpose of the trip.

9. (continued)
So many things that can initiate learning out-of-doors are sometimes overlooked - buds on twigs, a bird with something in its beak, an ant dragging a caterpillar along the ground, the direction in which dandelion fluff is blowing, the position and phase of the daytime moon.

Any single observation can be the beginning of exciting exploration and lead to the joy of further discovery.

Every observation leads to a question: What is inside buds? Why doesn't the bird swallow the worm in its beak? Where is the ant going with the caterpillar? What happens to the dandelion seeds after they blow away?

The most interesting questions are questions that do not have neat, precise answers, but this should not prevent your investigating them anyway. The out-of-doors is so full of interacting things, that answers are always new and interesting and different.

10. Collecting Specimens: The field trip may lay the groundwork for activities you will want to do in the classroom. Collect only those things as are absolutely necessary for such follow-up, because it is important that the children learn good conservation habits.

The basic rule is to leave a natural habitat undisturbed. Replace anything you move. Avoid stepping on plants or animals whenever possible. If an animal is caught and observed, it should be put back where it was found - allowed to "go home."

The field trip should be distinguished from a collecting expedition, which would be better carried out by you alone or with a few selected students.

Make all collections in accordance with the law or other prescribed regulations, and try to leave the place in as good, or better, condition than you found it.

III. POST-ACTIVITY

AFTER THE TRIP - LET THE MEMORY LINGER ON

Some leaders like to have group evaluations before a trip is concluded, or at a later time. In some instances, an evaluation is not necessary.

CREDITS

LEADING CHILDREN IN THE FIELD, U.S. Forest Service, R-6, Portland, Oregon. PUTTING CONSERVATION TO WORK, Teaching Aid #4, August 1965.

MAN AND HIS ENVIRONMENT "Preparing to Use the Environmental Study Area," pps. 16-20, National Education Association, 1970.

LIVING THINGS IN FIELD AND CLASSROOM, "Planning Any Type of Trip," pps. 97-99, Minnesota Math and Science Teaching Project, University of Minnesota, copyright 1969.

SUGGESTIONS FOR OUTDOOR FIELD TRIPS Ernest V. Blohm, Executive Secretary, Michigan Interagency Council for Recreation, Lansing Michigan, April 19, 1966.

TIPS FOR TRAIL LEADERS
Charles Holtzer, Consultant,
Conservation and Outdoor Education,
Colorado Dept. of Education,
September 1968.

RESOURCES, BACKGROUND INFORMATION,

AND SPEAKERS

DEPARTMENT OF ENVIRONMENTAL HEALTH
University of Washington (543-3620)
Tours of facilities for all grade levels.

U.S FOREST SERVICE
Pacific N.W. Region (R-6)
Motion picture films available in Region 6 library, available on loan for educational purposes to schools, civic groups, churches.
Write to: WASHINGTON STATE FILM LIBRARY
Olympia, Wash. 98504 (206-753-3390)

DEPARTMENT OF CIVIL ENGINEERING: Air and Waste Quality Control
University of Washington
Tours and information.

EDMONDS RECREATION AND PARKS
Subject: Park Acquisition and/or Development
Rod Garretson, Dept. Director
Subject: Park Management
Rod Garretson or Don Burton, Park Superintendent
Subject: Recreation Program - Correct Park Usage, etc.
Doug Schafer, Recreation Supervisor

SNOHOMISH COUNTY PUD
Subject: Energy
Dick Downie, Environmental Coordinator
Don Rider, Public Relations

SNOHOMISH COUNTY HEALTH DEPARTMENT
Subject: Nursing
Ann Wilson, Kathy Carrol (259-9386)
Subject: Environmental Health
Sewage - Charles Mangum (259-9473)
Food Programs - includes restaurants, bakeries, itinerant food (circuses, carnivals, etc.), meat markets.
School, Solid Waste, Camping Areas, Mobile Home Courts, Chemical and Physical Health Hazards Unit, Rodent Control - Byron Robertson (259-9499)
Water and Noise - Gary Fraser (259-9499)
Epidemiology Unit - Dr. Luke (259-9473)
V.D. Section

THE INSTRUCTOR PUBLICATIONS, INC.
Subject: Ecology Posters #750
Dansville, NY 14437

WASHINGTON LUNG ASSOCIATION
216 Broadway East
Seattle, WA 98102
Contact: Mr. David L. Chivers, Regional Program Director
For: "Our Polluted Air" Mobile Workshop (one month in advance), various air pollution pamphlets and health information, films also available on request.

EDUCATIONAL SERVICES CENTER
Bill Hamilton (778-8965) or John McAdam (778-8658)
Information and resources

SEATTLE AUDUBON SOCIETY
712 Joshua Green Bldg.
Seattle, WA 98101 (622-6695)

FILMS

Numbers in parentheses immediately following titles indicate lengths of film in minutes. C for color; BW for black and white.

Conservation

A MATTER OF TIME	Conservation Foundation 30 East 40th Street New York, N.Y.
PARADISE POLLUTED	Roy Wilcox Productions 301 Allen Hill Meriden, Conn.
THE PERSISTENT SEED	National Film Board of Canada Canadian Embassy 1746 Mass. Ave. NW Washington, D.C. 20036
WITH EACH BREATH	New York State Air Pollution Control Board 84 Holland Avenue Albany, N.Y.

CONSERVATION AND BALANCE IN NATURE	International Film Bureau 332 South Michigan Avenue Chicago, Ill. 60604
OUR CHANGING ENVIRONMENT	Encyclopedia Britannica Films, Inc. 1150 Wilmett Avenue Wilmett, Ill.
SO LITTLE TIME	USDI Sport Fisheries and Wildlife 710 N.E. Holladay Portland, Oregon
TOWARDS TOMORROW	BBC through British Embassy Washington, D.C.
3 YOUNG AMERICANS IN SEARCH OF SURVIVAL	3M Company Television Production
WILD RIVERS (28)	Modern Talking Picture Service 1212 Avenue of the Americas New York, N.Y. 10036
CLEAN WATERS (20) Free	U.S. Public Health Service Audiovisual Facility Chamblee, Georgia 30005
NATURE'S PLAN (14) $6.00	Encyclopedia Britannica Films 202 East 44th Street New York, N.Y. 10017
IT'S YOUR DECISION - CLEAN WATER (14 1/2)	Association Films 600 Grand Avenue Ridgfield, N.J. 07657
THE RIVER MUST LIVE (21) Free	Shell Oil Company Film Library 450 North Meridan Indianapolis, Ind. 46204
TROUBLED WATERS (28) Free	U.S. Senate Public Works Committee Room 4204, New Senate Office Bldg. Washington, D.C. 20510
GREAT LAKES INVADER, THE SEA LAMPREY (13 1/2) Free	Bureau of Sport Fisheries and Wildlife 1002 N.E. Holladay Street Portland, Oregon
THE WHOOPING CRANE (14) Free	Bureau of Sport Fisheries and Wildlife

NATIONAL PARKS, OUR AMERICAN HERITAGE (17-c)	Seattle Public Library 4th and Madison Seattle, Wash. 98104
RETURN OF THE BUFFALO (10-BW)	Seattle Public Library
WOODLAND MANNERS (19-C)	Seattle Public Library
LIFE ON THE WESTERN MARSHES (15-C)	Seattle Public Library
LET'S KEEP AMERICA BEAUTIFUL (18-C) $1.50	Richfield Oil Company P.O. Box 75007 Sanford Station, Los Angeles, Calif.
WINGS OVER BLITZEN (39-C)	Bureau of Sport Fisheries and Wildlife 730 N.E. Pacific Street Portland, Oregon 97208

Most of the following films on conservation are available to teachers through their school district, or to anyone through Rarig's Inc., Audio-Visual Sales and Service, 2100 North 45th, Seattle, Wash.

CONSERVATION (10-BW)
TOPSOIL (10-C)
CASCADE MOUNTAINS (20-C)
WATER-FOUNTAIN OF LIFE (30-C)
WATER CONSERVATION (11-BW)
WHAT MAKES RAIN? (10-BW)
CONSERVING OUR NATURAL RESOURCES (18-C)
UNTOUCHED LAND (30-C)
LITTERBUG (8)
CITIES AND SUBURBS: METROPOLITAN (9-C)

Ecology and Enjoyment of Nature

The following films are free of charge. Write Conservation Film Center, P.O. Box 9163, Seattle, Wash. 98119

LIVING RIVER - GRAND CANYON (29-C)
WILDERNESS ALPS OF STEHEKIN (30-C)
GLACIER PEAK HOLIDAY (30-C)
BULLDOZED AMERICA (27-BW)
NORTH CASCADES (35 mm slide show with script)
THE REDWOODS (20-C)
THE MYTHS AND THE PARALLELS (27-BW)
BEACH HIKE (17-C)
TWO YOSEMITES (10-C)
GLEN CANYON (28-C)
WASTED WOODS (15-C)
HELLS CANYON (33 mm slide show with script)

Most of the following films on ecology and enjoyment of nature are available to teachers through their school district or to anyone through Rarig's Inc., Audio-Visual Sales and Service, 2100 North 45th, Seattle,Wash.

THE SEA (26-C)
WORLDS OF DR. VISHNIAC (C)
COLUMBIA FRONTIER (27-C)
WORLD OF LITTLE THINGS (C)
BALANCE OF NATURE (17-C)
WHAT PLANTS NEED FOR GROWTH (10-C)
ECOLOGY (24-C)
LIFE STORY OF THE OYSTER (11-C)
DISTRIBUTION OF PLANTS AND ANIMALS (16-C)
PLANKTON, PASTURES OF THE OCEAN (10-C)
ANIMAL WAR-ANIMAL PEACE (27-C)
OUR MISTER SUN (60-C)
FATHER OCEAN (10-C)
WHY PLANTS GROW WHERE THEY DO (11-C)
CANOEING THE BIG COUNTRY (14-C)
DESERT COMMUNITY (12-C)

YELLOWSTONE: OUR FIRST NATIONAL PARK (15-C)
GRASS BLADE JUNGLE (11-C)
HERITAGE OF SPLENDOR (16-C)
AROUND THE BIG LAKE (17-C)
TRAIL RIDE (20-C)
LIFE IN THE OCEAN (11-C)
SPRING (9-C)
LIFE ON A DEAD TREE (11-C)
CONSERVATION: JOBS FOR YOUNG AMERICA (19-C)
LIFE IN THE OCEAN (11-C)
ANIMALS THAT LIVE IN THE SURF (11-C)
MARSH COMMUNITY (11-C)
THE DESERT (10-C)
ANIMAL LIFE AT LOW TIDE (11-C)
SPRING COMES TO A POND (13-C)
CAVE COMMUNITY (13-C)

WAY OF LIFE (Illustrates predatory tendencies of nearly all animals)	Wash. State Game Dept. 600 N. Capital Way Olympia, Wash. 98501
WILDERNESS TRAIL (14-C)	U.S. Forest Service Regional Office P.O. Box 4137 Portland, Oregon
WILDERNESS ENCAMPMENT (27-C)	U.S. Forest Service Regional Office
NATURE NEXT DOOR (28-C)	Sierra Club 1050 Mills Tower San Francisco, Calif.
AN ISLAND IN TIME (28-C)	Sierra Club
THE GREAT SWAMP (30-C) (Documentary of a national wildlife refuge)	Bureau of Sport Fisheries and Wildlife Office of Regional Director 730 N.E. Pacific Street, P.O. Box 3737 Portland, Oregon
PATTERNS OF THE WILD (27 1/2-C) (Shows that the wildlife of a forest does not merely live in a forest, but as a part of it.)	Bureau of Sports Fisheries and Wildlife
BIRDS AND THEIR MIGRATION (18-C)	Bureau of Sports Fisheries and Wildlife

FOR THE PEOPLE - WILDLIFE REFUGE (22 1/2-C)	Bureau of Sport Fisheries and Wildlife
GREAT BLUE HERON AND THE SNOWY WHITE EGRET (15-C)	Bureau of Sport Fisheries and Wildlife
KNOW THE HAWKS (10 1/4-C)	Bureau of Sport Fisheries and Wildlife
OUR MAGIC LAND (12 1/2-C) (For primary)	Bureau of Sport Fisheries and Wildlife
WATER BIRDS (22 1/2-C) Walt Disney	Bureau of Sport Fisheries and Wildlife

The following films can be rented from National Audubon Society, 1130 Fifth Avenue, New York, N.Y. 10028. Prices range from $5.00 to $11.00. All are 16 mm sound films.

THE BALD EAGLE, OUR NATIONAL BIRD (35-C)
BEAVER VALLEY (32-C)
BIRDS OF THE COUNTRYSIDE (11-C)
BIRDS OF THE DOORYARD (11-C)
THE GOONEY BIRD (20-C)
ISLAND IN DANGER (25-C)
ISLANDS OF GREEN (24-C)
KENTUCKY'S FEATHERED RAINBOW (28-C)
LOOK DOWN (55-C)
A James W. Wilkie Film
THE LOON'S NECKLACE (11-C)
NATURE'S HALF ACRE (33-C)
POISONS, PESTS AND PEOPLE (55-BW)
THE TOUCH OF NATURE (54-C)
THE WINDOW (17-C)
THE WOOD DUCKS WORLD (30-C)
YOUR LIVING HERITAGE (12-C)
VILLAGE BENEATH THE SEA (90-C) ($50.00)

The following 16 mm films must be used in a sound projector. Massachusetts Audubon Society, South Great Road, Lincoln, Mass. 01773.

BEARGRASS GREEK (20-C)
BEAVER DAM (16-C)
GREEN CITY (30-C)
LAND OF THE PRAIRIE DUCK(25-C)
LIFE IN A TROUT STREAM (10-C)
LIFE IN THE WOODLOT (17-C)
MARSHLAND IS NOT WASTELAND (14-C)
OUR WILDLIFE HERITAGE (30-C)
POPULATION ECOLOGY (19-C)
SILENT SPRING OF RACHEL CARSON (57-BW)
THEIR HERITAGE (20-C) Free
WORLD IN A MARSH (23-C)
YOURS FOR A SONG (14-C)

The following films are available from the Seattle Public Library, Main Branch; free upon request.

AMERICA'S LAST FRONTIER (13-C)
LAND OF THE RED GOAT
OLYMPIC RAIN FOREST (10-C)
BETWEEN THE TIDES (20-C)
ALPINE WILDFLOWERS (11-C)
EDIBLE PLANTS OF FIELD AND FOREST (24-C)
FAMILY AFOOT IN THE YUKON (22-C)
MT. RAINER NATIONAL PARK (20-C)
ANIMALS OF ALASKA (11-C)
MARINE ANIMALS OF THE OPEN COAST (22-C)
CONIFER TREES OF THE PACIFIC N.W. (16-C)

FREE AND INEXPENSIVE MATERIALS

The following are good sources for free or low cost informational materials on Population, Conservation and Ecology. Write for information about available materials.

AMERICAN ASSOCIATION OF UNIVERSITY WOMEN
2401 Virginia Avenue, N.W.
Washington D.C. 20037
Resource directory on pollution control - 75¢.
Anti-pollution pamphlets and study guide - 75¢.

AMERICAN FORESTRY ASSOCIATION
919 17th Street N.W.
Washington, D.C. 20006
Pamphlets and bulletins. "You Can Be a Conservationist" by O.E. Randall.

CLEAN WATER
Washington, D.C. 20242
Suggestions about what communities can do to combat water pollution. Free.

CONSERVATION FOUNDATION
1250 Connecticut Avenue N.W.
Washington, D.C. 20036
Variety of pamphlets and articles dealing with the many aspects of ecology.

ENVIRONMENT MAGAZINE
438 North Skinker
St. Louis, Missouri 63130
Monthly publication dealing with effects of technology on the environment, published by Committee for Environmental Information. Student subscription - $5.00 per year.

INTERSTATE PRINTERS AND PUBLISHERS
Danville, Illinois 61832
Bibliography of books and other teaching materials in conservation field.

ISAAC WALTON LEAGUE OF AMERICA
1326 Waukegan Road
Glenview, Illinois 60025
"Clean Water-- It's Up to You," excellent pamphlet on what local citizens can do about water pollution. Free. Monthly conservation newsletter.

LOCAL TUBERCULOSIS AND RESPIRATORY DISEASE ASSOCIATIONS
"Air Pollution Primer"

NATIONAL PARKS ASSOCIATION
1701 18th Street N.W.
Washington, D.C. 20036
Free or low-cost pamphlets and articles on thermal pollution, noise pollution, pesticides, and basic ecology. Excellent.

NATIONAL WILDLIFE FEDERATION
1412 16th Street N.W.
Washington, D.C. 20036
Conservation Directory - a guide to all state and national sources of conservation and environment information. $1.50. Informational packets on ecology and pollution - special packets from elementary to adult level. Excellent. Monthly newsletter.

PLANNED PARENTHOOD, WORLD POPULATION
515 Madison Avenue
New York, N.Y. 10022
Bibliography, film guide and following reprints: "Eco-Catastrophe," by P. Ehrlich; "300 Million Americans Would be Wrong," by D. Lilienthal; "The Human Race Has Maybe 35 Years Left,: by D. Lyle.

POPULATION REFERENCE BUREAU
1955 Massachusetts Avenue N.W.
Washington, D.C. 20036
Good bibliography, source list, and film guide on population. Minimal cost.

PORTLAND CENTER FOR CONTINUING EDUCATION
P.O. Box 1491
Portland, Oregon 97207
Attn: Mr. Lawless
"Observing our Environment, " - $3.00, relating elementary students to our environment.

PROJECT MAN'S ENVIRONMENT
National Education Association
1201 16th Street N.W.
Washington, D.C. 20036
Information on curriculum (K thru 12) environmental study areas.

PUBLIC AFFAIRS INFORMATION SERVICE
U.S. Government Printing Office
Washington, D.C. 20401

PUBLIC AFFAIRS PAMPHLETS
381 Park Avenue South
New York, N.Y. 10016
Pamphlet #421 - "An Environment Fit for People" - 25¢
#403 - "The Battle for Clean Air" - 25¢

SIERRA CLUB
Mills Tower
San Francisco, Calif. 94104
List of publications, pollution, population information, protection of scenic areas.

SUPERINTENDENT OF DOCUMENTS
Government Printing Office
Washington, D.C. 20402
"No Laughing Matter" - book of syndicated cartoons on air and water pollution (70¢). "Primer on Waste Water Treatment" - current and possible future methods of treating sewage and industrial waste (55¢). "Showdown" - picture pamphlet discussing "showdown" for water quality (65¢). "From Sea to Shining Sea" - presentation of environmental situation of U.S. with good bibliography, film list, and resource guide ($2.50).

U.S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Public Health Service
Bureau of Disease Prevention and Environmental Control
Washington, D.C. 20201

U.S. GOVERNMENT PRINTING OFFICE
Washington, D.C. 20401
Bureau of Census; Bureau of Indian Affairs; Bureau of Land Management; Bureau of Reclamation; Department of Agriculture; Department of Health, Education and Welfare; Department of the Interior; Forest Service; National Park Service; Office of Education; Soil Conservation Service.

WILDERNESS SOCIETY
729 15th Street N.W.
Washington, D.C. 20005
Reports, pamphlets, reprints on preservation and use of our natural heritage.

ZERO POPULATION GROWTH
367 State Street N.W.
Los Altos, Calif. 94022
Newsletters, brochures, ecology leaflets, reprints.

You may also write to your local:
- Chamber of Commerce
- Historical Societies
- Preservation Societies
- State Offices
- State Office of Public Instruction
- State Offices:
  - Agencies of Pollution, Bureau of Fisheries, Fish and Wildlife Service, Wildlife Commission.

PAMPHLETS AND OTHER PUBLICATIONS

A CONSERVATION HANDBOOK - 50¢ Ordway, Samuel H., Jr.	The Conservation Foundation, 1949 New York
OBJECTIVES AND CONTENT OF CONSERVATION EDUCATION FOR AMERICAN YOUTH - 50¢	U. Press, Ohio State University, 1950, Columbus Ohio
MATERIALS FOR TEACHING CONSERVATION AND RESOURCE USE - 35¢	National Assoc. Biology Teachers, Interstate Printers and Pub., Danville Illinois.
RESOURCES FOR A GROWING POPULTION, Seaton, Fred - 25¢	Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C.
THE GLORY TRAIL - One copy free Swift, Ernest	The National Wildlife Federation 1412 16th St. N.W. Washington, D.C. 20036
THE PACIFIC NORTHWEST - $1 Zim, Herbert S.	Golden Press, New York
THE CONSERVATION OF OUR NATURAL RESOURCES, Seaton, Fred - 20¢	Conservation Bulletin 3-9, Supt. of Documents, above
CAREERS FOR WOMEN IN CONSERVATION - Free	U.S. Dept. of Labor, Leaflet 50, Women's Bureau, Washington, D.C.
WATER AND OUR FORESTS AIB-71 - 10¢	U.S. Dept. of Agriculture Forest Service, Washington, D.C.
FORESTS AND THE NATURAL WATER CYCLE K-1 - Free	U.S. Dept. of Agriculture
FOREST AND WATER 0-28 - Free	U.S. Dept. of Agriculture
HOW A TREE GROWS (16 x 12 poster) - 10¢	U.S. Dept. of Agriculture

FOREST REGIONS OF THE U.S.	U.S. Dept. of Agriculture
BIRDS, CN-1 - Free (There is a series of conservation notes number CN-1 through CN-21 available for education.)	Bureau of Sport Fisheries and Wildlife Dept. of Interior Washington, D.C. 20240
ENDANGERED WILDLIFE SERIES - Free (Numbered EWS-1 through EWS-5)	Bureau of Sport Fisheries and Wildlife
SOMETHING ABOUT HAWKS, SA-2 - Free	Bureau of Sport Fisheries and Wildlife
TREES OF WASHINGTON - Free (Extension Bulletin #440)	Cooperative Extension Service College of Agriculture Washington State University Pullman, Wash.
OFF ON THE RIGHT FOOT (A guide to proper wilderness use)	The Wilderness Society 729 15th Street N.W. Washington, D.C. 20005
ACTION FOR CLEAN WATER	The Wilderness Society
THE NEW CONSERVATION	The Wilderness Society
NEW CHALLENGES FOR WILDERNESS CONSERVATIONISTS	The Wilderness Society
A NEW LOOK AT OUR CROWDED WORLD Stewart, Maxwell, #393 - 30¢	Public Affairs Supt. of Documents U.S. Government Printing Office Washington, D.C.
PROGRESS IN THE PREVENTION AND CONTROL OF AIR POLLUTION - 30¢	Public Affairs
VEGETATION OF OREGON AND WASHINGTON (PNW Circular #80) - Free	Pacific N.W. Forest and Range Experimental Station P.O. Box 3141 Portland, Oregon 97208

LOCAL CONTACTS

Local decision-makers responsible for environmental quality:

CITY COUNCILMEN
Cities of Lynnwood, Edmonds and Mountlake Terrace

CITY PLANNING COMMISSIONS

SOUTH SNOHOMISH CHAMBER OF COMMERCE

How do present and future business needs affect planning for a quality environment? Will there have to be changes in business activity in order to solve environmental problems?

SNOHOMISH COUNTY PLANNING DEPARTMENT

What are comprehensive land use plans? How closely are these followed? Who is responsible to see that land use plans are complied with?

SNOHOMISH COUNTY PLANNING COMMISSION

How are Planning Commission members selected? What is their responsibility? How does their work relate to that of the Snohomish County Planning Department? Why is there a Planning Commission and not just a Planning Department? Why are there rezones and other exceptions to land use plans? How are these exceptions obtained?

SNOHOMISH COUNTY HEALTH DEPARTMENT

Environmental Health Division

What does the department have to do with problems of sewage disposal, water supplies (Spada Lake), food establishments, schools, tourist facilities, rodent and insect control, swimming pool and bathing beaches, refuse disposal?

SNOHOMISH COUNTY ENGINEER

What is the role of the County Engineer in making decisions on roads, transportation and other capital improvements in Snohomish County?

CITY DEPARTMENTS OF CITIES OF LYNNWOOD, EDMONDS AND MOUNTLAKE TERRACE

Building Department - What is the purpose of building codes? How are codes enforced? Are there exceptions? Why? How are decisions on exceptions made? What about conflicts between creating and enforcing of codes on the one hand, and protecting property rights on the other? Are there basic principles for resolving such conflicts?

Planning Department - What is the current city comprehensive plan? Where should businesses go? Apartments? Other multiple residences? What about lot sizes, etc.? What power does the Planning Department have? How are exceptions to the comprehensive plan decided? How does a city comprehensive plan relate to the county comprehensive plan? Is there some relating of local to regional planning?

Recreation and Parks Department

SNOHOMISH COUNTY ECONOMIC DEVELOPMENT COUNCIL
This organization is comprised of business and other organizations representatives to study and suggest to local land use decision-makers how area-wide comprehensive planning could take place for economic development of areas like Snohomish Valley.

Contact: Mr. Lloyd Repman, Chairman (Al 2-6236)
Monte Cristo Hotel
Everett, Washington

CITY OF EDMONDS
250 5th West
Edmonds, Wash. 98020
City Engineer, Planning Department, Recreation and Parks, Police Department, Water Department (200 Dayton, Edmonds, Wash. 98020)

ALDERWOOD WATER DISTRICT
City Center
Alderwood Manor, Washington 98036

CITY OF BRIER
City Hall
23303 Brier Rd.
Brier, Washington 98036

CITY OF LYNNWOOD
19100 44th Ave. West
Lynnwood, Washington 98036

CITY OF MOUNTLAKE TERRACE
Mountlake Terrace, Washington 98043

TOWN OF WOODWAY
11422 238th S.W.
Edmonds, Washington 98020

LYNNDALE GARDEN CLUB

LOUISE MARSHALL
16812 36th Ave. West
Lynnwood, Washington 98036
Author and editor of environmental and recreational materials.

SOUTH SNOHOMISH COUNTY COUNCIL ON HUMAN RELATIONS

PORT OF EDMONDS
456 Admiral Way
Edmonds, Washington 98020

SOUTH COUNTY SENIOR CITIZENS CENTER, INC.
220 Railroad Avenue
Edmonds, Washington 98020

MARIAN KOHN
1023 241st Place S.W.
Edmonds, Washington 98020
Parent and Research Associate, Zoology Department, University of Washington.

SNOHOMISH COUNTY HEALTH DEPARTMENT
South County Office
19701 Scriber Lake Road
Lynnwood, Washington 98036

SNOHOMISH COUNTY PARKS DEPARTMENT
Everett Courthouse (259-9317)
Everett, Washington

SNOHOMISH COUNTY PLANNING DEPARTMENT
Everett Courthouse (259-9311)
Everett, Washington

SUPERINTENDENT OF SCHOOLS
ISD 109
Everett Courthouse (259-0621)
Everett, Washington

SNOHOMISH COUNTY P.U.D. #1
21018 Highway 99
Lynnwood, Washington 98036

BOY SCOUTS OF AMERICA
Evergreen Council, Inc.
1615 1/2 Hewitt Avenue
Everett, Washington

SNOHOMISH COUNTY ENVIRONMENTAL COUNCIL

ADDRESSES FOR AGENCIES LISTED IN THE FILM LISTS

Aetna

Aetna Life & Casuality
Audio Visual Services
151 Farmington Ave.
Hartford, Conn. 06115

A-S

Association-Sterling Films
866 3rd Ave.
New York, N.Y. 10022

Common

Commonwealth Film Distributors
1440 S. State College Blvd.
Bldg 6-K
Anaheim, Calif. 92806

EBEC

Encyclopedia Brittanica Educational Corp.
425 N. Michigan Ave.
Chicago, Ill. 60611

Ethyl

Ethyl Corp.
Corporate Public Relations Dept.
330 S. 4th St.
Richmond, Va. 23219

FAA

Federal Aviation Administration
Film Library AC-44.5
P.O. Box 25082
Oklahaoma City, Oklahoma 73125

GASP

Group Against Smog And Pollution
P.O. Box 2850
Pittsburg, Pa. 15230

JF

Journal Films, Inc.
909 W. Diversey Pkwy
Chicago, Ill. 60614

Motor

Motor Vehicle Mfg Assn, Inc.
320 New Center Bldg
Detroit, Mich. 48202

MTPS

Modern Talking Picture Service
2323 New Hyde Park Rd.
New Hyde Park, N.Y. 11040

MUE

Media For Urban Environment
75 Frost St.
Brooklyn, N.Y.

NAC

General Services Admin.
National Archives And Records Service
National Audiovisual Center
Washington, D.C. 20409

NBC

NBC Educational Enterprises
30 Rockefeller Center
New York, N.Y. 10020

NFBC

National Film Board of Canada
680 5th Avenue
New York, N.Y. 10019

Shell

Shell Film Library
450 N. Meridian St.
Indianapolis, Ind. 46204

LESSON OUTLINE

TOPIC: _____
LEVEL: _____
EST.TIME: _____
SUBJECTS: _____

I. LEVEL V OBJECTIVE

II. LEVEL VI OBJECTIVE

III. TEACHER BACKGROUND INFORMATION

IV. MATERIALS NEEDED

V. ACTIVITY

A. PRE-ACTIVITY _____ Time: _____

B. ACTIVITY _____ Time: _____

C. POST-ACTIVITY _____ Time: _____

VI. RESOURCES

VII. SUGGESTED ADDITIONAL ACTIVITIES